May 3, 1948

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

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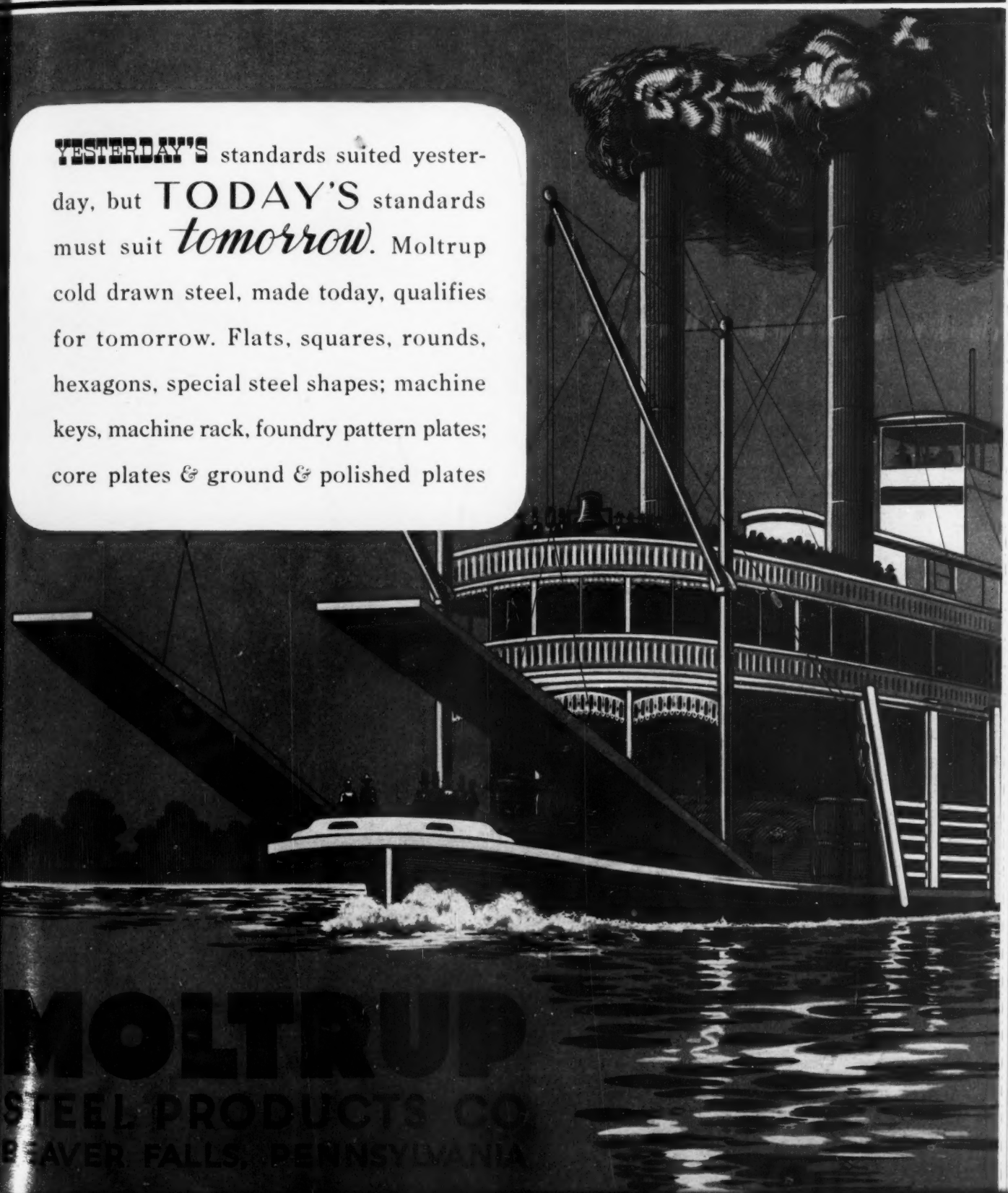
EDITORIAL INDEX, PAGE 45

YESTERDAY'S standards suited yesterday, but TODAY'S standards must suit *tomorrow*. Moltrup cold drawn steel, made today, qualifies for tomorrow. Flats, squares, rounds, hexagons, special steel shapes; machine keys, machine rack, foundry pattern plates; core plates & ground & polished plates



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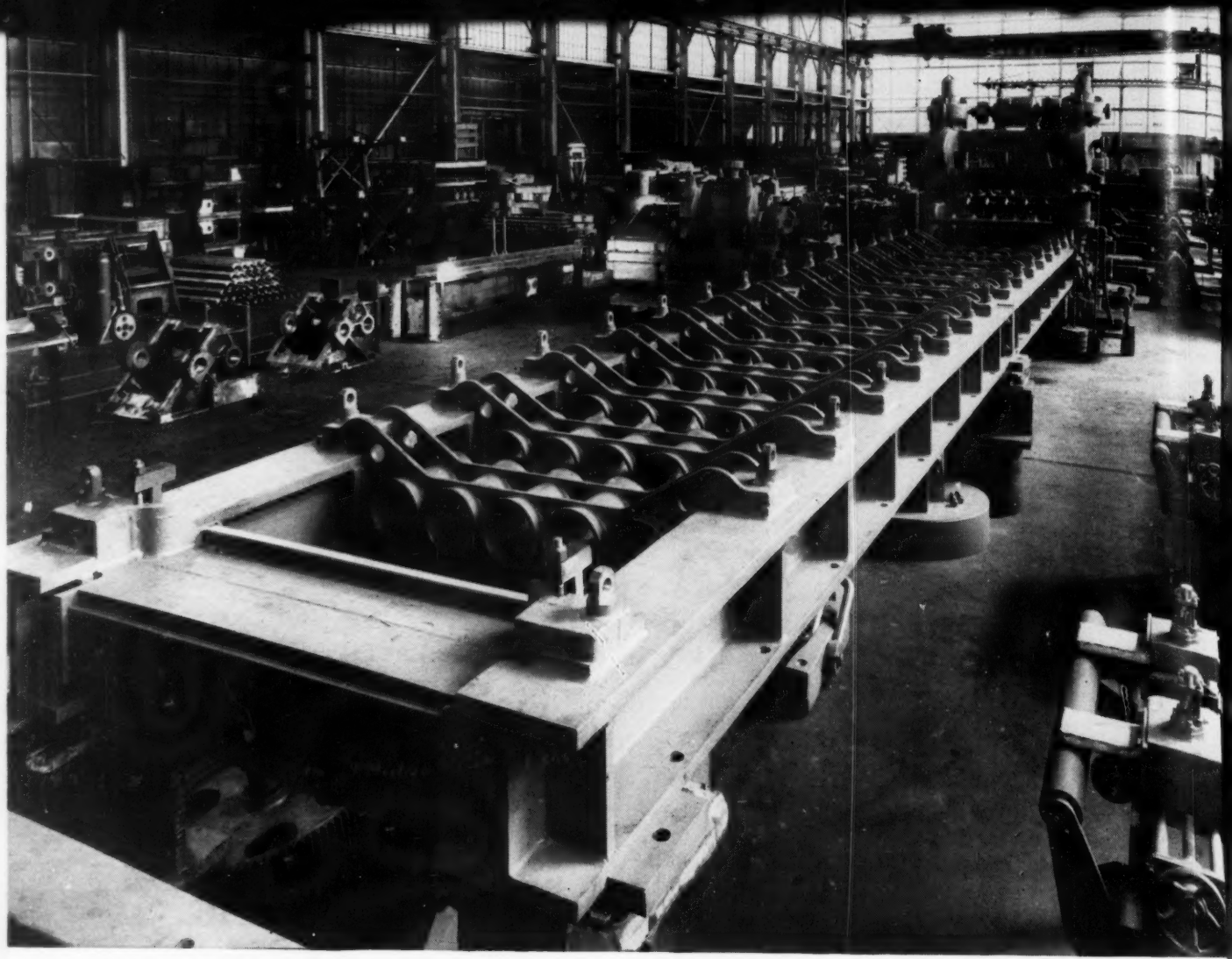

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- This company manufactures most of the world's seamless tube mills, and also makes continuous butt weld pipe mills, rolls, auxiliary items and many other mill equipment products.

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 122, NO. 18 MAY 3, 1948

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Revised...

AT YOUR FINGERTIPS...

Standard Designations and Chemical Composition Ranges for Heat and Corrosion Resistant Castings have been revised by the Alloy Casting Institute. The chart below puts all this data conveniently

DESIGNATION	Co... tion —							
	C	Mn max.	Si	P max.	S max.	Cr	Ni	Other Elements
CA-15	0.15 max.	1.00	1.50	0.04	0.04	4	1 max.	Mo 0.5 max.†
CA-40	0.20-0.40	1.00	1.50	0.04	0.04	1	1 max.	Mo 0.5 max.†
CB-30	0.30 max.	1.00	1.00	0.04	0.04	18-2	max.	—
CC-50	0.50 max.	1.00	1.00	0.04	0.04	26-30	1	—
CE-30	0.30 max.	1.50	2.00	0.04	0.04	26-30	8	—
CF-8	0.08 max.	1.50	2.00	0.04	0.04	18-21	8-11	—
CF-20	0.20 max.	1.50	2.00	0.04	0.04	18-21	8-11	—
CF-8M	0.08 max.	1.50	1.50	0.04	0.04	18-21	9-12	Mo 2.0-3.0
CF-12M	0.12 max.	1.50	1.50	0.04	0.04	18-21	9-12	Mo 2.0-3.0
CF-8C	0.08 max.	1.50	2.00	0.04	0.04	18-21	9-12	Cb 8xC min., 1.0 max.
CF-16F	0.16 max.	1.50	2.00	0.17	0.04	18-21	9-12	Mo 1.5 max., Se 0.20-0.35
CF-16Fa	0.16 max.	1.50	2.00	0.04	0.20-0.40	18-21	9-12	Mo 0.40-0.80
					04	20-23	10-13	—
					04	22-26	12-15	—
					04	22-26	12-15	—
					04	23-27	19-22	—
					04	26-30	4 max.	Mo 0.5 max.†
					04	26-30	4-7	Mo 0.5 max.†
					04	26-30	8-11	Mo 0.5 max.†
					04	18-23	8-12	Mo 0.5 max.†
					04	24-28	11-14	Mo 0.5 max.† N 0.2 max.
					04	26-30	14-18	Mo 0.5 max.†
					04	24-28	18-22	Mo 0.5 max.†
HU	0.35-0.75	2.00	2.50	0.04	0.			
HW	0.35-0.75	2.00	2.50	0.04	0.			
HX	0.35-0.75	00	2.50	0.04	0.			

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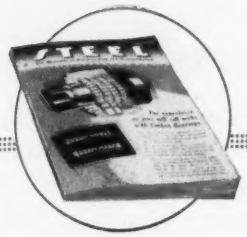

May 3, 1948

Worth Trying

Denial by United States Steel Corp. of the request of the United Steelworkers of America (CIO) for a substantial wage increase and the concurrent announcement that prices of certain steel products were to be reduced to the extent of $25 million annually on May 1 constitute one of the most significant actions ever taken by the management of the world's largest steel producer.

It was dramatic because it represented a complete reversal of the corporation's policy on wages and prices. As recently as the middle of February, United States Steel had announced price advances on semifinished steel. In doing so, it aroused an unprecedented volume of protests from critics who charged that these advances were untimely in view of the recent break in commodity prices, that they would be construed by the unions as an invitation to demand substantial third round wage increases and that U. S. Steel had acted without considering the impact of its decision upon the public interest.

The reversal of policy announced by President Fairless on April 22 serves as an almost perfect answer to these critics. It will go a long way toward recouping such loss of prestige as may have been threatened by the price episode of mid-February.

More important, however, is the outcome of the corporation's wage and price action. Will it succeed in its objective of "halting further advances in living costs?"

The answer lies in the balance of numerous inflationary and deflationary forces. If the former still are strongly in the ascendancy, U. S. Steel's gesture probably will be no more effective than were those of Ford Motor, International Harvester and others at earlier dates. On the other hand, if the backbone of inflation already has been or is about to be broken, the psychological influence of U. S. Steel's action, taken in conjunction with that of similar moves by General Electric and Westinghouse Electric, Bethlehem Steel and others may provide the impetus needed to halt the rise in living costs.

The management of United States Steel Corp. is gambling on its conviction that current economic conditions are ripe for a psychological deflationary shot in the arm. If it wins out on this score, it will deserve credit for a magnificent feat of industrial statesmanship.

* * *

IMPORTANT QUESTION: Coming from Denmark to the United States at the age of 19, the late William S. Knudsen first worked as a riveter, got a job on a railroad and later was employed by a bicycle manufacturer, which subsequently was absorbed by Ford Motor Co. While with Ford, Knudsen rose rapidly because of his knack of solving production problems. In due time he shifted to Chevrolet of General Motors. Here his ability carried him to the presidency. In World War II he was onetime head of the War Production Board. He was one of the outstanding masters of the distinctive American technique of mass production.

In many respects, Bill Knudsen's career conformed closely to the time-honored pattern wherein the boy with talent finds in America the opportunity to make good. But does that pattern still exist? If a potential Bill Knudsen should walk down a gangplank tomorrow, would he have a chance to follow in Bill's footsteps? Today a union riveter, railroad worker or machinist is discouraged by union pressure from rising above his fellow workers. Personnel di-

(OVER)

rectors say we no longer can hope to recruit executives from the ranks.

Does this mean that we are permanently deprived of the great contributions made by the legions of Knudsens who have risen to greatness from obscure beginnings? The answer is important to America's future. —p. 75

* * *

SHAPE OF A MARKET: One of the highlights of the Triple Mill Supply convention at Atlantic City last week was the address of Charles E. Wilson, president of General Electric Co., in which he amplified the theme that "all distribution is small business" and that "selling, whether it be a product, a service, or an idea, is the greatest small business in the world."

"Most of the mistakes we make in judging markets and devising sales strategy," said Mr. Wilson, "go back to the fact that even the best of us forgets that the shape of a market is usually the shape of a man—no bigger than a man and having the same human characteristics. . . . Every sale has to be made to one man—across a table, across a desk, across a counter or in personal communication. Vendor and vendee must be close enough for hands to touch and minds to meet."

We are approaching a period of competition in which the utmost realism in selling and distribution will be important. —p. 59

* * *

OFF TO A GOOD START: Paul G. Hoffman's Economic Co-operation Administration, which is tackling the job of directing the economic recovery of 16 European nations, is getting away to a good start.

Already ECA has received more than 17,000 applications for employment, at least 300 of which are from men of exceptional ability.

Also the initial statements of policy by Mr. Hoffman and his associates are highly reassuring. Mr. Hoffman promises definitely that the European assistance program will not add to inflationary pressures at home. His food expert says that total food shipments from the United States will be reduced as a result of the ECA program. ECA will encourage dealings between private parties in the United States and the participating countries. Total exports "will almost certainly be less than they have been in the last year." ECA will seek to bring scarce material into the United States on a larger scale. It will encourage American corporations to establish branch plants abroad, or to acquire such plants.

These objectives are highly gratifying to American industry. —p. 70

* * *

TIME TO ACT ON SCRAP: Because iron and steel scrap is a critical national resource of unusual importance to the national economy at the present time, the editors of this publication have prepared a special report in which all pertinent information regarding this subject is presented in a compact package.

No person can read the text and statistics of this report without realizing that restoration of the scrap cycle promptly is a No. 1 "must" for this nation. In order to make up for the great tonnage of scrap that was lost before and during the war, we must bring back from abroad substantial tonnages until the cycle again can operate on domestic sources in the traditional manner.

Currently Britain and Russia are doing a better job of scrap recovery than we are. It is time for the United States to go "all out" on the return of foreign scrap. —p. 61

* * *

HOW TO PRICE STEEL?: At the moment it is impossible to predict how violent will be the repercussions of the Supreme Court's 6-to-1 decision outlawing use of the multiple basing point pricing system in the cement industry. In a general way it seems likely that the decision, while intensifying the fight of steel producers against the Federal Trade Commission's attack against their multiple basing point system, ultimately will lead to important changes in the pricing of steel and of certain other commodities.

Unfortunately the court, and FTC, are more concerned with alleged conspiracy and price fixing than with the interests of consumers. F.O.B. mill, which seems to be the government's ultimate objective, may appear to solve the problem of collusion by sellers, but what price does it exact from consumers? There is some consolation in the hope that if the court and FTC get too far away from realism, Congress can act. —p. 53

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

HISTORIC DECISION—Far-reaching and revolutionary changes in the marketing of steel and many other products may result from the U. S. Supreme Court decision outlawing the multiple basing point system in cement pricing (p.53). Should the policy set down by the court, at the instigation of the Federal Trade Commission, be followed to its logical conclusion, its repercussions will be felt throughout the economy. Steel consuming plants located far from the producing mills will be at a price and supply disadvantage. Steel producers will be forced to localize their markets further; some may enlarge their warehouse holdings to retain a share of the national business. Many metalworking companies will face new problems in marketing their products.

WAR AGAINST INFLATION— Industry's campaign to halt rising living costs by holding the present wage line and cutting prices is gaining support from major segments of the steel and metalworking industries. Important companies (p.56) are joining in the battle to stop inflation, and chances for third round wage increases in the heavy industries are slight. Organized labor now is expected to push its demands for social insurance programs.

CRITICAL RESOURCE— Iron and steel scrap, once considered a by-product of industry and of little concern to anyone except those buying and selling it, has assumed the role of a critical national resource in the years since Pearl Harbor. Scrap now is a limiting factor in steel production, and thus in the output of all hard goods. Facts and figures on this vital raw material are contained in a Special Report by the Editors of STEEL (p. 61).

ORGANIZING FOREIGN RELIEF— No. 1 glamor boy in Washington right now is Paul Hoffman, administrator of economic relief for foreign nations. The machinery by which $5.3 billion of American money will be spent in the next 12 months in an attempt to rehabilitate western European economies is being organized (p.70) and apparently a lot of people want to get into the act; ECA has received more than 17,000 applications for employment at a time when other government jobs are going begging. Industry advisors will be used by Mr. Hoffman in determining aid administration policies.

METALWORKING PROFITS— Annual reports of most metalworking companies for 1947 make good reading for stockholders. Earnings of 50 companies, representing a cross section of the industry, reported $203 million net earnings last year, compared with $110 million in 1946. Higher profits largely were due to better steel supply and the absence of work stoppages. Many companies reporting for the first quarter of 1948, however, show profits are dipping again, the result of steadily advancing costs (p.58).

MACHINE TOOLS— Electronic controls for machine tools, viewed as a theoretical possibility when the first Machine Tool Electrification Forum was held in 1936, have become an actuality. The improved controls and drives were described by participants in the forum (p.60).

MILL SUPPLY—Selling is the "greatest small business in the world," GE President C. E. Wilson told the Triple Mill Supply Convention last week. Training of salesmen and importance of distribution were stressed (p.59).

SIGNS OF THE TIMES—Lone Star Steel Corp. plans to diversify its products against the time when a fading sellers' market will destroy present price premiums (p.73). A pipe mill and other facilities are contemplated . . . . Chance Vought Aircraft Division of United Aircraft Corp. is moving (p.78) to Texas . . . Big Bill Knudsen, mass production genius of the automotive industry and one-time head of the War Production Board, is dead (p.75), but his influence still is seen in the 35 million autos on American highways . . . Higher prices for coal and metals in Germany have been granted by the Anglo-American Control Council. . . . The action is expected (p.69) to reduce or eliminate subsidies . . . Steel mill operations regained 11½ points to 87 per cent of capacity last week, will approach prestrike rate this week. Steel consumers will feel the impact of the disruption caused by the coal strike for weeks to come.

An INLAND DEVELOPMENT That DOUBLES Enamelers' Output!

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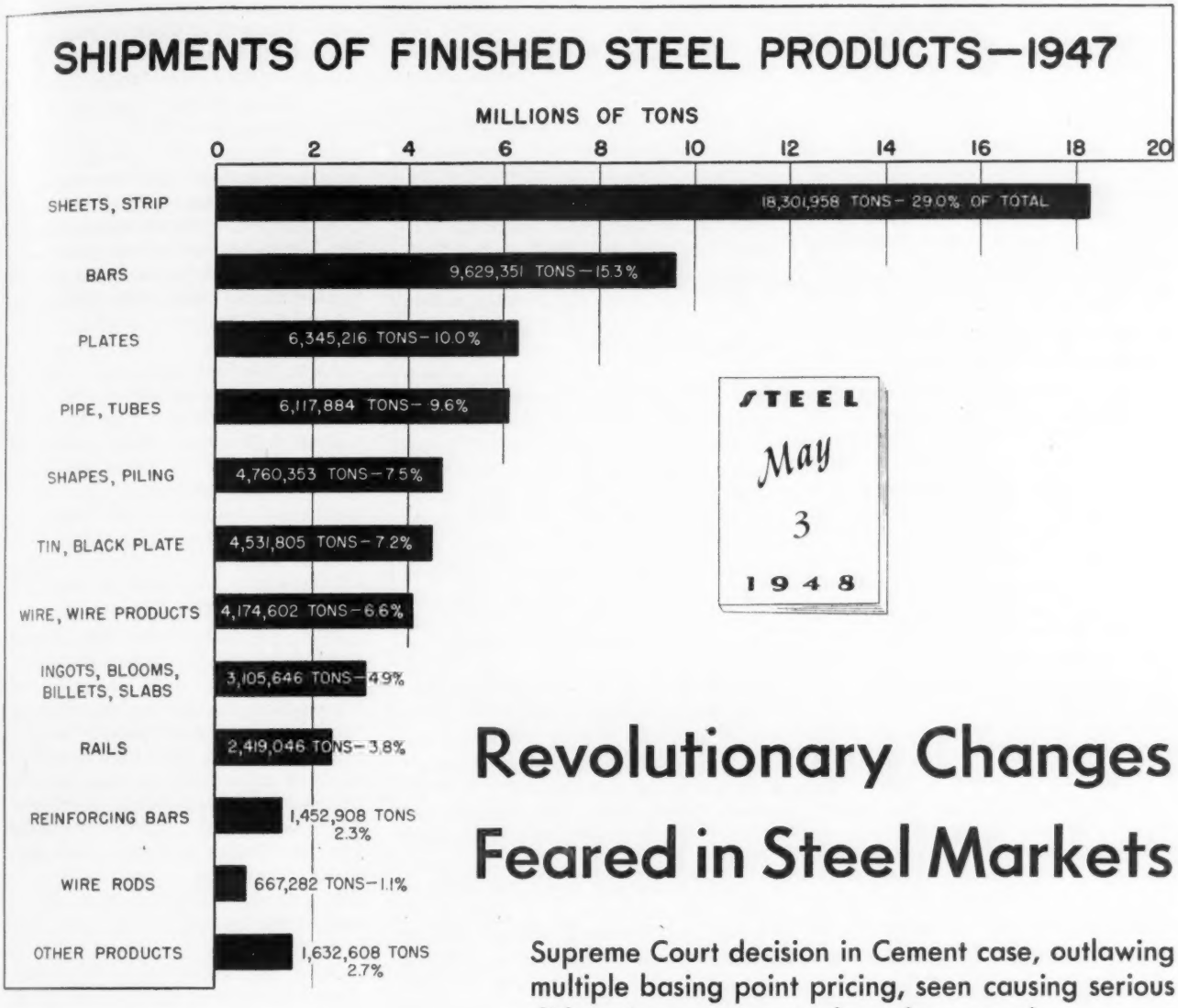

Revolutionary Changes Feared in Steel Markets

Supreme Court decision in Cement case, outlawing multiple basing point pricing, seen causing serious dislocations among steel producers and consumers if applied to industry generally

REVOLUTIONARY changes in the marketing of iron and steel products, with accompanying severe repercussions on the entire economy of the nation, are threatened as result of the United States Supreme Court's decision last week holding that use of the multiple basing point pricing system, in conspiracy, in the sale of cement is illegal.

Multiple basing point pricing is used in the steel industry as well as in many others.

The Supreme Court decision in the Cement case came as a distinct shock to steel producers who currently are fighting an action against their pricing system before the Federal Trade Commission. Most steel executives declined last week to comment until their legal counsel had time to fully digest the court's ruling. However, the consensus was that should the court's views in the Cement case extend to steel, they would result in serious dislocations among steel producers and consumers of steel as well.

Expresses Concern—Irving S. Olds, chairman, United States Steel Corp., declared last week that congressional action could, and may be, the ultimate solution to the multiple basing point question. He said he was greatly concerned over the possible effects of the Supreme Court's ruling, and declared that if the principle as laid down for the cement industry is applied elsewhere it might well have far-reaching effects on steel and other heavy industries, and, in fact, if applied rigidly, might affect the merchandising of countless consumer items, even down to cigarettes.

In steel, he said, banning of the multiple basing point system would cause very serious dislocations, not only among producers but consumers as well. Further, it would definitely raise the cost of steel to consumers. The FTC, he believed, in its position on basing points has closed its eyes to the realities of the situation. The economic location of a steel mill is based primarily on two factors: Availability of raw materials and close proximity to the market, he said. Any change in the proper balancing of these two factors, as he believed might result in the banning of the present steel pricing system, would shoot the cost of steel up materially.

See Drive Intensified — Washington anti-trust law specialists are of the opinion the cement decision heralds an intensified drive against all industries using multiple basing point pricing. That the decision gives the Federal Trade Commission encouragement in its efforts to outlaw use of the system generally was reflected in the elation evident among FTC attorneys upon receiving news of the Supreme Court's ruling; the flag over the Federal Trade Commission building seemed to be flying a few notches higher on its staff.

The Federal Trade Commission considers the decision one of the

most significant relating to monopolistic pricing practices handed down in many years by the high court, holding it to be a sweeping reaffirmation of the Commission's findings and order.

The Commission says the decision has a definite and substantial impact upon the status of similar systems of identical delivered prices used by a number of heavy goods industries, and it expresses the hope organized industry now will avail itself of the opportunity to conform voluntarily to the law as determined by the Supreme Court in the Cement case.

Indications are the steel industry, if anything, now will intensify its fight to defend its pricing system. There is no sign that any thought is being given to throwing in the towel in the current action before the FTC, and immediately adopting f.o.b. mill or similar pricing.

So far as can be determined at this time it is the intention of the industry to press the fight for its pricing system through to the Supreme Court. Most observers, however, anticipate a cease and desist order will shortly be issued against its use by the FTC, such as was issued last week against the refractories industry which uses multiple basing point pricing similar to that in steel.

Decision Seen Distant — Pending decision of the Supreme Court in the Steel case, which might be several years distant, the industry would have time to adjust its pricing policies to conform with legal restrictions as implied under the Supreme Court's ruling in the Cement and other price restraint cases.

In this connection, Mr. Olds pointed out that Federal Trade Commission hearings now going on in steel are similar to those in the cement industry, and said it would be difficult to say how long such litigation might be carried on before it reached a Supreme Court decision. In the case of the cement industry the controversy had been going on for 12 years.

Expects Further Action — Commenting on the cement decision, Everette MacIntyre, chief of the Division of Anti-Monopoly Trials, said it "opens the way for further action by the FTC against unlawful price-fixing combinations."

Lynn C. Paulson, key man in laying out the FTC's strategy in the Cement case, and who is chief trial attorney in the commission's action against the steel industry, hailed the decision as a new "magna charta" recognizing the FTC as a "very great tribunal."

The Cement case, FTC officials pointed out, involved a pricing pattern which is similar to those in other industries against which action now is in process. Some have zone prices, and some employ freight equalization, but all meet the basic condition of a multiple basing point system with identical delivered prices. Actions pending are against the steel, steel chain, rigid steel conduit, refractory, metal lath and white lead industries.

In the Cement case, instituted in 1937, the Supreme Court ruled 6 to 1 that the industry's multiple basing point system of pricing constituted an illegal and unfair method of competition which discriminated against cement purchasers everywhere in the nation. Written by Associate Justice Hugo L. Black, the decision reversed the seventh Circuit Court of Appeals, Chicago, which had set aside the FTC order. Stripped of legal language, the Supreme Court held the industry practice of selling cement under identical terms and at identical delivered prices was in violation of the law.

Two Charges—The complaint that was passed upon by the Supreme Court in the Cement case contained two charges: 1, Existence of a combination involving the use of a multiple basing point pricing system; and 2, exercise of systematic price discrimination between customers of each respondent.

As to the first charge of unlawful combination in restraint of trade, the decision said: "We sustain the commission's holding that concerted maintenance of the basing point delivered price system is an unfair method of competition prohibited by the Federal Trade Commission Act."

With respect to the second charge, of unlawful combination to discriminate in price, the decision said:

"We hold that the Commission properly concluded that respondents' pricing system results in price discrimination, the finding that the discriminations substantially lessened competition and that they were not made in good faith to meet a competitor's price are supported by evidence accordingly. The Commission was justified in issuing a cease-and-desist order against continuation of the unlawful discriminatory pricing system."

Although the Court's decision to sustain the Commission's cease-and-desist order was predicated on the existence of a conspiracy, the decision went on to say:

"While we hold that the Commission's findings of combination were supported by evidence, that does not mean that the existence of a combination is an indispensable ingredient of an unfair method of competition under the Federal Trade Commission Act."

Broad Powers—Section 5 of the Trade Commission Act, the court said, gives the Federal Trade Commission broad powers to protect the public against unfair pricing by the courts. The dicta in this portion of the decision inferred that the Commission is a body of experts and the best judge as to what constitutes unfair competition. The decision went on to reject the cement industry's contention that the action should have been brought by the Department of Justice and that the Federal Trade Commission's procedure in bringing this case, therefore, was improper. The conclusion was that the Federal Trade Commission has full power to wage war on unfair methods of competition under

FREIGHT RATES TO THREE LEADING CONSUMING AREAS

(All rail, carload rates, in effect prior to increases effective May 6, on iron and steel articles, cents per 100 lb)

From	To Chicago	From	To Boston	From	To Detroit
Waukegan	13.2c	Jersey City	42.0c	Shelby	28.8c
Milwaukee	19.2c	Trenton	43.2c	Cleveland	31.2c
Anderson	31.2c	Bethlehem	44.4c	Lorain	31.2c
Muncie	33.6c	Philadelphia	44.4c	Canton	33.6c
St. Louis-Granite City	34.8c	Syracuse	44.4c	Massillon	33.6c
Detroit	40.8c	Coatesville	48.0c	Youngstown	36.0c
Shelby	42.0c	Lebanon	49.2c	Anderson	36.0c
Cleveland	44.4c	Milton	51.6c	Muncie	36.0c
Lorain	44.4c	Steelton	51.6c	Buffalo	37.2c
Massillon	45.6c	Sparrows Point	51.6c	Chicago	40.8c
Canton	45.6c	Buffalo	52.8c	Milwaukee	40.8c
Youngstown	49.2c	Williamsport	52.8c	Pittsburgh	42.0c
Portsmouth	49.2c	Johnstown	60.0c	Weirton	42.0c
Pittsburgh	52.8c	Pittsburgh	63.6c	Portsmouth	43.2c
Weirton	52.8c	Youngstown	63.6c	Waukegan	43.2c
Buffalo	56.4c	Cleveland	63.6c	Johnstown	48.0c
Johnstown	57.6c	Lorain	63.6c	Syracuse	48.0c
Syracuse	63.6c	Weirton	63.6c	Williamsport	51.6c
Williamsport	63.6c	Canton	64.8c	St. Louis-Granite City	52.8c
Milton	64.8c	Massillon	64.8c	Milton	52.8c
Steelton	66.0c	Detroit	66.0c	Steelton	58.8c
Lebanon	66.0c	Shelby	66.0c	Lebanon	58.8c
Sparrows Point	67.0c	Muncie	73.0c	Sparrows Point	60.0c
Bethlehem	69.0c	Anderson	73.0c	Bethlehem	60.0c
Coatesville	69.0c	Portsmouth	74.0c	Coatesville	62.4c
Philadelphia	71.0c	Milwaukee	75.0c	Jersey City	62.4c
Trenton	71.0c	Chicago	76.0c	Philadelphia	62.4c
Jersey City	73.0c	Waukegan	76.0c	Trenton	62.4c
		St. Louis-Granite City	83.0c		

its organic act and does not need to operate within the confines of the Clayton, Sherman and other acts.

In the above views Justice Harold Burton was the lone dissenter. He found that the evidence was insufficient to sustain any finding of the combination charged by the Commission. He further held that in the absence of such combination, respondent's acts and practices were not illegal under either the Federal Trade Commission Act or the Clayton Act.

Contention Rejected—The Court rejected the contention of two respondents that because they sell only to points in a single state they are not engaged in interstate commerce and hence not liable under the Trade Commission Act.

"We cannot sustain this contention," said the decision. "The fact that one or two participants in the combination happen to be selling only within the borders of a single state is not controlling in determining the scope of the Commission's jurisdiction. The important factor is that the concerted action of all of the parties to the combination is essential in order to make wholly effective the restraint of commerce among the states."

The Court also settled the question of dual jurisdiction. It rejected the contention that the Federal Trade Commission Cement case be dismissed because of the Justice Department action brought at Denver last year. The decision stated that "the Commission has jurisdiction to declare that conduct tending to restrain trade is an unfair method of competition even though the self-same conduct may also violate the Sherman Act." It pointed out that the legislative history shows a congressional intention "to permit simultaneous use of both types of proceedings."

What Pricing Now?—Now that the cement industry has been deprived of its traditional price system which was so well understood by producer and consumer alike, what pricing methods is it to use in the future? The answer the industry will have to work out, each company, for itself. The Federal Trade Commission has no further interest in the industry except to obtain compliance and watch for future violations. Some government attorneys think the logical outcome will be for each cement plant to sell in its "own territory"—that is to those points to which it has a favorable freight rate.

In its decision the Supreme Court in one place said there is no prohibition upon meeting a competitor's lower price, provided the "particular sale is made in good faith." The prohibition, it points out, is "directed solely at concerted, not individual, activity on the part of the respondents." But in another place the Supreme Court warns that the statutory provisions allowing the good faith meeting of competitor's prices do not permit a seller to use a collusive sales system which "constantly results in his getting more money for like goods from some customers than he does from others."

Commerce Department, which has been watching the case strictly as an observer, is of the opinion that the effect of decisions such as that in the Cement case will be to promote the dispersal of industry.

See Industry Dispersal—"This will not come at once," a commerce spokesman told STEEL, "rather it will take place as industry further expands its capacity. New plants will be located closer to consuming areas. This trend will be accelerated particularly in view of the fact that freight rates now are climbing to prohibitive levels. As far as long hauls are concerned the effect should be to make under-developed sections of the country more self-contained. For example: The day of shipping manufactured goods from industrial cities of the North Atlantic region to the Far West will soon be over."

It is pointed out in the steel trade that under the multiple basing point system, successor to Pittsburgh Plus abandoned in 1924, the number of basing points has increased at a wholesale rate. Today there are over 80 basing points and virtually every mill center is a basing point. So-called phantom freight has practically disappeared as a result, and freight absorption by the mills has increased correspondingly. As a matter of fact, the steel markets have increasingly tended to become localized since 1938, and since the end of the war this trend has been intensified by the constant rise in freight rates which now are so high many steel producers have been forced to abandon the servicing of market areas distant from their plants.

In its Cement decision the Supreme Court ruled as illegal absorption of freight as well as the adding of fictitious freight in the determining of

(*Please turn to Page* 170)

Present, Past and Pending

■ KAISER-FRAZER SELLS INDIANAPOLIS MILL
DETROIT—Kaiser-Frazer Corp. has sold, effective July 1, its Indianapolis Rolling Mill Division, the former Chapman-Price Steel Co., which K-F purchased last October. Purchaser is a group headed by Victor Nemeroff, president, Electro Mfg. Corp., Chicago. Improvement in the K-F steel supply outlook is said to have prompted the sale.

■ NEW COLD REDUCTION MILL BEGINS OPERATING
CHICAGO—New 54-in. four stand tandem continuous cold reduction mill went into operation last week at Carnegie-Illinois Steel Corp.'s sheet and tin mill at Gary, Ind.

■ FORD PUTS SKIN PASS MILL INTO OPERATION
DETROIT—Rebuilt 84-in. skin pass cold rolling mill purchased from Granite City Steel Co. and erected in Ford Motor Co.'s steel plant is now in operation.

■ CONTINUED HIGH-LEVEL PRODUCTION EXPECTED
NEW YORK—Industrial production is generally expected to continue at or near an all-time peak through first half of 1948, a National Industrial Conference Board survey shows.

■ LACK OF STEEL HALTS PLYMOUTH ASSEMBLIES
DETROIT—Chrysler Corp.'s assemblies of Plymouth cars is suspended this week for lack of body steel at Briggs Mfg. Co.

■ KAISER-FRAZER BEGINS SIX-DAY WEEK
DETROIT—Kaiser-Frazer Corp. began a six-day work-week Saturday to help meet demand for its cars.

■ CONTINENTAL CAN CO. GIVES WAGE INCREASE
NEW YORK—Continental Can Co. last week granted a 10-cent-an-hour wage increase to 1400 employees at its Wheeling, W. Va., Cambridge, O., and Norwood, O., plants.

■ PITTSBURGH MANUFACTURER RAISES WAGES
PITTSBURGH—Acheson Mfg. Co., producer of brass pipe fittings, granted a five-cents-an-hour wage raise last week.

Industry Declares War on Inflation

Major steel and metalworking companies refuse third round wage increases. Many reduce prices in attempt to arrest increasing living costs

INDUSTRY'S double-barreled onslaught on inflation — by cutting prices and holding wages at present levels—is gathering momentum. Powerful support came last week from major steel and metalworking companies. Proponents of the campaign are hopeful that other companies and industries will jump on the band wagon and that a chain reaction of price reductions will be established.

The larger steel producers are following the lead of United States Steel Corp. in refusing to grant a third round wage increase to the United Steelworkers. Announcements of such action were made last week by Bethlehem Steel Corp., Republic Steel Corp., Jones & Laughlin Steel Corp., Pittsburgh Steel Co., Crucible Steel Co. of America, Youngstown Sheet & Tube Co. and Lukens Steel Co. Other large producers indicated they would take similar action.

Price reductions on a broad list of steel products were announced last week by U. S. Steel subsidiaries. (see accompanying box). Several other major steel producers indicated they soon will announce competitive prices; still others were continuing to study the price situation. U. S. Steel's reductions will amount to $25 million annually; Bethlehem's reduction will total about $10 million a year.

Electric Companies Cut—Price reductions also have been announced by General Electric Co. and Westinghouse Electric Corp.

Both companies have refused to grant third round wage increases to the United Electrical, Radio & Machine Workers.

Westinghouse reductions since the first of the year amount to more than $14 million on an annual basis, the company announced. Latest cuts average about 5 per cent on the items affected, including switchgear, airport lighting, radios, electric refrigerators and water heaters.

General Electric reduced prices on a wide variety of items several months ago. The latest action by GE affects fractional horsepower motors, switchgear, conventional transformers, lightning arresters, feeder regulators, cutouts and power capacitors.

Results Problematical — Whether the current anti-inflation campaign is successful depends on how many companies and industries give it support by refusing further wage increases and by reducing prices, economists believe.

More than a year ago, Ford Motor Co. and International Harvester Co. attempted to start a similar campaign by reducing prices in the face of advancing costs. Their example was not followed by other major companies. Organized labor won a second round of postwar wage increases within a few months. Costs continued to rise, and both companies were forced to abandon their campaign.

Last week Ford Motor Co. announced price increases on its new Mercury line ranging from $315 to $420. Benson Ford, director of the Lincoln-Mercury Division, explained, however, that the 1949 Mercury was "an all new automobile designed expressly to serve a higher quality market than heretofore."

Steel producers who have announced price reductions have emphasized the cuts are of experimental nature. If the anti-inflation campaign is not successful and if costs continue to advance, the companies may reconsider both wages and prices.

Profits Declining—Net earnings of several major steel producers in the first quarter of 1948 dipped slightly from the first quarter of 1947. This was due to increasing costs, as steel shipments and sales generally were higher in the March quarter this year than last.

What action on prices will be taken by the smaller steel producers is yet to be determined. Many of the smaller companies now are selling their products at prices above those quoted by the major producers.

Nonintegrated companies are threatened with a new pinch on profits. The new price reductions will not affect semifinished steel, which was increased a few weeks ago. Mills depending on purchases of semifinished will be hard pressed to become competitive in price with the integrated producers.

Some observers believe that the smaller producers who are charging premium prices will continue on that basis for the present.

Insurance Concessions Asked—The United Steelworkers, denied a wage increase and bound by a no-strike contract, is hoping to win concessions on the social insurance program which it has submitted to major steel companies. The union is continuing to press its wage demands against the companies but chances of winning any increases at this time are extremely slight. Practically all companies have left the door open for new wage negotiations before the current contract expires next April,

U. S. Steel Subsidiaries' New Prices

UNITED States Steel Corp. subsidiaries placed the following new reduced delivered prices into effect on shipments made on and after May 1. They apply on carload lots and are f.o.b. cars delivered within switching limits, except as noted. The reductions range from $1 to $5 a ton.

CARNEGIE-ILLINOIS STEEL CORP.

PRODUCTS	PGH.	CHICAGO	GARY	YGSTN.
Carbon steel:				
Stand. structural shapes	2.81c lb.	2.81c lb.	2.81c lb.	
Beams & bearing piling	2.76c lb.	2.76c lb.		
Plates	2.96c lb.	2.96c lb.	2.96c lb.	2.933c lb.
Floor plates	4.11c lb.	4.11c lb.		
Hot rolled bars	2.91c lb.	2.91c lb.	2.91c lb.	2.883c lb.
Concrete reinforcing bars	2.76c lb.		2.76c lb.	2.733c lb.
Hot-rolled sheets, 18 G & hvr.	2.81c lb.	2.81c lb.	2.81c lb.	2.783c lb.
Galvanized sheets	3.91c lb.		3.91c lb.	
Cold-rolled sheets	3.51c lb.		3.51c lb.	
Vitrenamel sheets	3.91c lb.		3.91c lb.	
Electrical grade sheets	5.26c lb.		5.26c lb.	
Hot-rolled strip			2.81c lb.	2.783c lb.
Standard rails No. 1-OH	2.70c lb. FOB shipping mill			
Standard rails No. 2-OH	2.60c lb. FOB shipping mill			
Tie plates	3.55c lb. FOB shipping mill			
Splice bars for std. rail	3.75c lb. FOB shipping mill			
Light rails (60 lb./yd. & under)	3.11c lb.			
Axles	4.51c lb.		4.51c lb.	
Holloware enamel. black plate	4.71c lb.		4.71c lb.	
Hot dipped tin plate-cokes, 1.50 lb. coating (pot yield)	$6.70—per base box (freight to be added)		$6.70—per base box (freight to be added)	
Alloy steel:				
Alloy hot-rolled bars	3.26c lb.	3.26c lb.	3.26c lb.	3.233c lb.

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if living costs continue to rise.

Industrial relations observers believe the union now will concentrate its efforts on obtaining a welfare program. Five different programs costing from 5.24 to 9.65 cents an hour per employee have been proposed by the union. The most elaborate plan is being asked of United States Steel, Jones & Laughlin and other large producers. It calls for:

1. Life insurance for employees in active service, in the amount of 18 months pay.

2. A paid-up policy of $1500 for employees retired for age or disability.

3. Cash benefits of $35 a week for nonoccupational sickness or accidents, beginning the fourth day in case of sickness and the first day in case of accidents, for not more than 52 weeks.

4. Hospitalization benefits of $8 a day, plus up to $80 for services and extras during each confinement. Benefits are limited to 70 days.

5. Reimbursement for surgical fees on a standard $225 scale.

Gross cost of this program is set at 11.14 cents per hour per man, but with dividends ploughed back into the fund the net cost would be reduced to 9.65 cents per hour.

Dependents would be included in the hospitalization and surgical benefits, under the union's proposal.

Cost Breakdown—Costs of the various benefits of the program break down as follows:

For employees' life insurance, 2.1 cents per hour.

For employees' retirement or disability, 0.9 cents.

For sickness and accident benefits, 2.28 cents.

For hospitalization of employees, 2.13 cents.

For hospitalization of dependents, 1.49 cents.

For surgical expenses for employees, 1.29 cents.

For surgical expenses for dependents 0.95 cents.

Alternative plans may be submitted to the smaller producers and the nonbasic steel companies, ranging in cost from 5.24 to 7.68 cents an hour.

Steel producers may agree to some variation of the union's proposal over coming months. Rumors last week indicated U. S. Steel and the union might announce an agreement on some variation of the program around next Labor Day.

Jones & Laughlin has announced its intention to negotiate a social benefit plan "as expeditiously as is practicable." President Ben Moreell said the plan would involve life insurance, accident and sickness, and hospital and surgical insurance.

FTC Hits Refractory Firms

Commission orders 37 companies producing 75 per cent of refractories in U.S. to cease and desist from price fixing and use of devices like basing point system

FEDERAL Trade Commission last week ordered 37 corporations, which manufacture and sell more than 75 per cent of the refractory products produced in the United States, to cease and desist from a combination and conspiracy to fix prices and eliminate competition in the industry.

The order was also directed against American Refractories Institute, St. Louis, the industry's trade association, and its members, officers and directors.

The refractories industry includes more than 100 manufacturers, the gross value of whose production amounts to between $60 million and $100 million annually. The industry's largest consumer is the iron and steel industry, which takes about one-half of the total annual production of such products. The glass, copper-smelting, cement and wood pulp industries are also large consumers.

Forbids Price Fixing — The cease and desist order forbids the producers and the institute to enter into, continue or carry out any conspiracy or planned common course of action to fix or maintain prices, terms or conditions of sale; to adhere to any such fixed prices, terms or conditions of sale; or to engage in any of the following practices:

(1) Quoting or selling at prices calculated in accordance with the freight-equalization, delivered-price system, the zone delivered-price system or any other planned system or formula which produces identical price quotations or prices, or which prevents purchasers from finding any advantages in price in dealing with one or more of the respondents as against any of the other respondents in the action.

(2) Formulating, adopting or using compilations of "extra charges"—that is, the percentages of base prices which are added in computing the price of "special shape" brick and tile.

(3) Exchanging information as to current or future prices or other data tending to aid in securing compliance with announced prices, terms or conditions of sale.

(4) Compiling, exchanging and using "freight rate factors" or transportation charges used or to be used as a factor in computing prices or price quotations.

(5) Establishing or maintaining delivered-price zones or price differentials between such zones.

(6) Systematically quoting or selling on the basis of a delivered price calculated by adding to the price in effect at a basing point other than the actual shipping point a "transportation charge factor" from that basing point, or on the basis of a delivered price equivalent to such a sum.

(7) Quoting or selling on a delivered basis which systematically reflects the inclusion of "phantom freight"—that is, a charge or factor for transportation greater than the actual cost of transportation from point of shipment to the product's destination.

(8) Quoting or selling at prices which systematically differ among purchasers in terms of net prices fob point of shipment, according to location of purchasers, whereby such net prices are higher to nearby customers than to those more distantly located, and whereby the sum of such fob net prices plus common carrier transportation charges results in identical delivered costs to purchasers at any given destination from differently located respondents.

(9) Using "price leadership"—that is, following quotations announced by particular respondents—to produce "uniform or matched" prices.

(10) Determining and using any common basis for the selection or classification of customers or formulating and exchanging information concerning the customer classification granted or to be granted to any specific purchaser.

(11) Adopting, using or enforcing any minimum resale price agreements under which dealers and customers are required to maintain resale prices, terms or conditions collectively or co-operatively determined by any two or more sellers.

Resale Agreements — The order provides, among other things, that it shall not be construed as prohibiting any of the corporate respondents from entering into such contracts or agreements relating to the maintenance of resale prices as are permitted under the provisions of the Miller-Tydings Act, or from taking such action relating to export sales as is permitted under the provisions of the Webb-Pomerene Act.

Metalworking Earnings Improve

HIGH RATE of operations permitted the metalworking industry to improve its earnings position substantially in 1947.

Indicative of this, 50 companies representing a broad cross-section of the metalworking industry had aggregate net earnings in 1947 of $203,380,934, compared with $110,300,200, as shown in the compilation below.

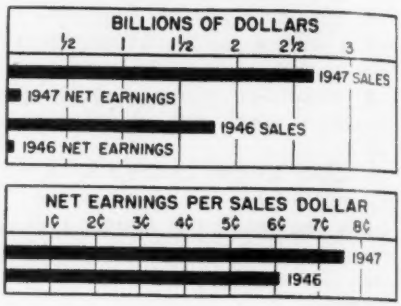
However, there will be a leveling off or a decline in 1948 if first quarter performance is any criterion.

Although most metalworking companies last year were unable to obtain all the steel they could have used they were able to push operations further above the break-even point in 1947 than in 1946, a year marked by prolonged strikes and reconversion problems. Consequently, the average net earnings per sales dollar for the 50 companies was 7.61c in 1947, compared with 6.11c in 1946. Sales by the 50 companies aggregated $2,673,310,826 in 1947 and $1,806,061,287 the previous year.

Other than high operations, factors contributing to the improved earnings in 1947 include increased price levels, inventory "profits" resulting from price advances, and the established accounting practice of basing depreciation charges on original costs rather than on replacement costs, now considerably higher. Inventory "profits" in most instances were, however, tied up immediately in new inventories at higher prices.

Sales and Net Earnings

(50 Metalworking Companies)



	Net Earnings 1947	Net Earnings 1946	Sales 1947	Sales 1946	Net Earnings 1st Qtr. 1948	Net Earnings 1st Qtr. 1947
Air-Way Electric Appliance Corp.	$952,968	$389,444	$10,975,398	$5,594,697	.....	$194,680
American Brake Shoe Co.	4,543,001	4,005,029	107,632,965	77,590,395	$976,006	1,510,444
American Machine & Metals Inc.	562,057	343,392	14,399,555	14,364,198	157,430	191,856
American Radiator & Standard Sanitary Corp.	19,425,912	9,905,543	200,043,537	123,734,095	.....	3,478,212
American Stove Co.	1,203,393	1,185,567	28,995,770	20,649,163	.....	385,334
Autocar Co.	2,250,955	1,859,416	39,460,313	36,036,188	161,917	1,326,253
Blaw-Knox Co.	3,003,701	3,352,071	55,626,055	46,068,338	784,244	773,522
E. W. Bliss Co.	2,285,274	1,386,735	33,787,081	24,176,007	633,650	742,209
Budd Co.	4,086,253	3,979,536*	193,500,132	122,254,375	.....	1,812,568
Chapman Valve Mfg. Co.	582,466	351,443	13,858,222	11,900,125	.....	99,372
Clark Equipment Co.	3,989,991	1,009,801	61,172,023	38,243,749	1,263,082	669,760
Cleveland Graphite Bronze Co.	2,903,557	2,468,877	30,543,648	28,230,418	522,437	1,055,823
Detroit-Michigan Stove Co.	2,445,857	2,007,655	20,693,376	14,955,408	648,344	618,719
Diamond T Motor Car Co.	1,909,108	964,217	41,678,282	22,691,824	.....	466,280
Doehler-Jarvis Corp.	6,235,609	4,785,644	64,359,258	44,167,480	2,183,153	2,156,905
Eaton Mfg. Co.	7,436,132	3,585,881	99,602,639	66,495,086	2,746,862	1,793,095
Emsco Derrick & Equipment Co.	1,059,298	715,139	13,361,378	10,913,900	332,136	275,579
Evans Products Co.	1,592,328	803,707	23,886,545	20,129,737	.....	629,956
Gabriel Co.	363,037	422,015	7,218,249	5,089,638	51,472	115,968
Gardner-Denver Co.	1,967,917	1,599,576	21,011,251	14,797,703	372,671	433,523
Greenfield Tap & Die Corp.	765,356	1,081,773	12,091,288	12,449,505	176,394	244,926
Holland Furnace Co.	3,696,320	1,986,600	35,129,642	25,196,572	.....	118,598*
Houdaille-Hershey Corp.	4,043,530	1,487,131	56,789,915	34,516,187	.....	836,065
International Business Machines Corp.	23,553,952	18,766,434	144,543,141	119,418,366	6,695,881	5,303,148
Kalamazoo Stove & Furnace Co.	799,296	180,421*	11,205,951	3,021,441	372,419	41,266
Lane-Wells Co.	1,750,851	923,872	9,877,216	7,602,374	.....	340,500
Link-Belt Co.	7,016,042	4,443,280	87,322,766	61,559,525	.....	1,489,460
Marion Power Shovel Co.	993,438	129,456	19,880,380	9,415,986	.....	211,638
Maytag Co.	7,101,579	3,027,930	56,916,620	26,822,498	.....	1,141,353
Minneapolis-Honeywell Regulator Co.	6,693,509	5,119,143	60,596,021	45,940,081	900,183	1,808,514
Monarch Machine Tool Co.	726,407	678,476	7,944,392	6,738,738	107,147	194,320
Motor Wheel Corp.	2,225,089	1,240,005	46,111,016	27,755,391	670,984	628,252
Mullins Mfg. Corp.	4,794,617	1,084,121	37,631,055	19,937,580	1,531,683	959,585
National Cash Register Co.	11,311,091	3,351,215	144,631,794	81,214,072	.....	2,373,669
National Supply Co.	8,591,807	3,027,836	133,570,590	98,894,859	1,237,923	1,771,025
Neptune Meter Co.	1,113,563	739,699	14,385,966	9,680,952	.....	.....
Noblitt-Sparks Industries Inc.	2,648,615	670,185	34,418,211	20,364,859	.....	372,491
Simonds Saw & Steel Co.	2,853,009	3,004,035	28,684,029	26,059,297	.....	858,892
Square D Co.	4,228,240	2,704,627	36,941,417	29,154,817	904,057	784,545
Studebaker Corp.	9,127,103	948,808	267,998,838	141,564,321	4,251,846	1,655,760
Sundstrand Machine Tool Co.	1,437,138	653,100	13,233,484	10,370,251	.....	.....
Towmotor Corp.	1,073,258	970,110	14,506,226	11,213,026	.....	263,850
Twin Coach Co.	2,275,542	1,618,757*	34,564,590	11,652,273	760,059	332,700
United-Carr Fastener Corp.	1,389,225	1,006,705	17,994,920	14,625,957	401,391	368,511
U. S. Hoffman Machinery Corp.	974,994	1,967,602	24,223,561	24,118,399	.....	308,516
Victor Equipment Co.	391,236	449,847	3,595,142	3,946,474	.....	101,925
Westinghouse Air Brake Co.	13,376,662	9,699,533	78,990,809	63,608,406	3,804,405	3,382,263
Weston Elec. Instrument Corp.	729,378	1,140,582	10,596,061	11,371,930	.....	309,683
Worthington Pump & Machry. Corp.	6,056,340	3,605,239	84,968,637	59,768,438	1,396,919	1,702,657
Yale & Towne Mfg. Co.	2,844,933	1,030,418	62,161,471	39,996,188	.....	556,355
Totals	$203,380,934	$110,300,200	$2,673,310,826	$1,806,061,287	.....	.....

*Net loss.

Mill Supply Men Stress Sales

Training of salesmen and importance of distribution—"the greatest small business in the world" emphasized by Triple Mill Supply convention speakers

IF THERE is a single point at which any distinction between large and small business completely disappears, it is at the point of sale, Charles E. Wilson, president, General Electric Co., Schenectady, N. Y., told the 2200 delegates attending the Triple Mill Supply convention sessions in Atlantic City, N. J., Apr. 26-28.

For the first time the participating associations, American Supply & Machinery Manufacturers' Association Inc., National Supply & Machinery Distributors' Association, and Southern Supply & Machinery Distributors' Association Inc., sponsored a conference booth program in connection with their sessions. No exhibits were on display at the 300 conference booths.

New projects adopted for promotion by the manufacturers' association include an industrial sales training film and a new order index directed toward closer checks on advance trends in business.

"All distribution is small business. Selling, whether it be a product, a service, or an idea, is the greatest small business in the world," declared Mr. Wilson, "because every sale has to be made to one man when the chips are really down."

Tool Industry Cited—Emphasizing the importance of small business to the American economy, Mr. Wilson asserted it would probably be a surprise to many to learn that according to usual understanding the machine tool industry is a small business, its total capacity now being in the neighborhood of $600 million annually.

Products of this industry and of the electrical apparatus manufacturing industry have in common the facts that increasing efficiencies make them obsolete long before they wear out, and that each operates at the foundation level of industry—machine tools can reproduce themselves and produce other industrial machinery, and electrical apparatus produces power which is needed to operate other industrial machinery.

With regard to each industry's ability now to furnish more of its products to aid in European recovery and in promoting America's industrial mobilization for defense, Mr. Wilson said their conditions are dissimilar. The machine tool industry is able to help and needs business; the electrical industry, on the other hand, in spite of expanded facilities, has its hands full supplying new generating equipment to utility companies currently unable to supply domestic power demands. This condition, he said, will eventually be overcome, but "war production and drought conditions conspired to create the present embarrassment in certain sections of the country."

Broad Training Needed — Good salesmen are to distribution what water and coal are to the production of electric power, declared F. J. Tone Jr., vice president, Carborundum Co., Niagara Falls, N. Y. In training distributor salesmen, sales directors are prone to spend too much time on their product's quality and characteristics, rather than on selling techniques and salesmanship in the broad sense.

Mr. Tone said production departments, of necessity, are being forced to provide sales with a diminishing margin within which to distribute goods; efficiency in distribution requires that the margin be wisely employed in times of high volume in order that in time of reduced sales sights are not set too high, compensation-wise.

Top management must be given a clear picture of the steps involved in "manufacturing" a sale, showing how with proper use of advertising the sales department can perform these steps at less cost, declared W. H. Gebhart, retiring president of the manufacturers' association.

JAMES G. GEDDES

Newly elected president, American Supply & Machinery Manufacturers' Association Inc.

Management should be given a breakdown of the factors involved in selling manufactured products and be convinced that the application of advertising to selling operations performs the same function in cutting unit costs that modern machinery performs in reducing unit cost of production.

In discussing distribution as pertaining to industrial suppliers, James G. Geddes, the manufacturers' association's new president, said it is the purpose and function of the industrial supply industry to make instantly available to producing plants items of maintenance, and supply tools and equipment and even materials. At first thought this may seem to imply that distributors are acting merely as warehouses, but nothing could be further from the truth, he said. Distributor salesmen actually act as sales engineers for the companies represented, not at the purchasing level but at the level of the plant engineer and master mechanic.

Willard L. Thorp, assistant secretary of state for economic affairs, discussed the European Recovery Program from blueprint to action, and Dr. Ralph C. Hutchison, president, Lafayette College, summarized world conditions under the general topic of human freedom.

Officers Elected — J. G. Geddes, H. K. Porter Inc., Everett, Mass., is the new president of American Supply & Machinery Manufacturers' Association Inc., succeeding W. H. Gebhart, Henry Disston & Sons Inc., Philadelphia.

Other officers elected were: K. B. Beardslee, Carboloy Co. Inc., Detroit, first vice president; F. T. Stone, Chisholm Moore Hoist Corp., Tonawanda, N. Y., second vice president; and W. W. Kemphert, Worthington Pump & Machinery Corp., Harrison, N. J.

Named to the executive committee were: James Tate, Dumore Co., Racine, Wis., and J. A. Proven, Sterling Tool Products Co., Chicago, for terms ending 1951; R. M. Johnson, Norton Co., Worcester, Mass., term ending 1950; Irving W. Lemaux Jr., Indianapolis Brush & Broom Mfg. Co., Indianapolis, term ending 1949. Continuing to fill unexpired terms on the committee are J. R. Kelley, Manning, Maxwell & Moore Inc., New York, and John G. Seiler, Tube Turns Inc., Louisville, Ky.

E. H. McLaughlin, Union Hardware & Metal Co., Los Angeles, was elected president, National Supply & Machinery Distributors' Association, and Richard Alcott, Riechman-Crosby Co., Memphis, Tenn., was named president, Southern Supply & Machinery Distributors' Association.

Berna Urges Tools for Europe

Machine Tool Electrification Forum hears pleas for "self-help" for other nations under Marshall Plan. New controls and drives described by manufacturers

BUFFALO—For the twelfth time since 1936, Westinghouse Electric Corp., Pittsburgh, provided facilities for a joint conference on the electrical problems in connection with drive and control of machine tools.

This 12th Machine Tool Electrification Forum, held at Hotel Statler here, Apr. 22 and 23, featured an address by Tell Berna, general manager, National Machine Tool Builders' Association on current affairs in the industry; one by W. F. Armstrong, vice president, General Motors Corp., on the machine tool requirements of the automobile industry; and one by Carl Taylor, president, Waukesha State Bank, on the outlook for continuation of what is known as "the American Way of Life."

European Needs Cited—Mr. Berna, who arrived at the forum after conferences in Washington, emphasized the important role which can and should be played by machine tools in the Marshall Plan. European countries, he said, are sorely in need of many kinds of mechanical equipment, including locomotives and freight cars, agricultural machinery, mining machinery and textile machinery.

There are shortages of these same things here in the United States, he pointed out. Also, Europeans have their own ideas about the design and construction of such things. Therefore, said Mr. Berna, we should furnish them machine tools—which we easily can furnish—and thereby make it possible not only for them to build their own machines but also the repair parts to get worn and damaged machinery back into use. This "self-help" will result in a lot of jobs and building of character—rather than encouraging idleness and undermining morale, as gifts of "ready made" articles tend to do.

Compliments New Tools—Mr. Armstrong had some highly complimentary remarks to make about the machines exhibited at the Machine Tool Show in Chicago last September. Many of them, he noted, embodied improvements which the automobile industry long had desired—especially those having to do with safety and convenience of operation and servicing. His review of General Motors' replacement programs and plans for added capacity showed that purchase of new model machine tools by that company far overshadows purchases from government surplus. That indicates that the show is "paying off" in a gratifying way.

The address by Carl Taylor aroused tremendous enthusiasm and also gave serious food for thought as to the possibility of loss of liberty here in America. Mr. Taylor reviewed the industrial and economic history of this country to show that individual ingenuity and initiative has had a lot more to do with our high level of living, than has the abundance of raw materials.

Now that we have gotten so much better off than the rest of the world, we must wake up to the fact that serious attempts now are being made to tear down what we have built up. He cited "chapter and verse" the history of inroads which have been made since 1932 in freedom of action, in the guise of various controls —wartime and otherwise—and what this may lead to if not checked.

Electronic Controls Are Here—At the time of the original forum in 1936, electronic control of machine tools was a theoretical rather than a practical possibility. At least that is the way it seemed to most of the machine tool men. This 1948 forum presented an entirely different picture in that respect. Kermit T. Kuck, engineering vice president, Monarch Machine Tool Co., Sidney, O., gave a paper on electronic lathe controls, in which he brought out that some of the electronic power and control units now are so compact and sturdy that they can be housed within the cabinet leg and bed of an engine lathe.

E. P. Bullard III, vice president in charge of manufacturing, Bullard Co., Bridgeport, Conn., described the application of a combined electrical and hydraulic system—called Man-Au-Trol—to the actuation of a three-spindle automatic lathe which produces three identical turned parts simultaneously.

J. J. Jaeger, electrical engineer, Pratt & Whitney Division, Niles-Bement-Pond Co., described the electromagnetic "feeler" system whereby a tracer finger following a wood or plaster form controls an end mill which reproduces this form in a steel block—thus producing a punch and die. This has made possible developments such as the pressed steel "turret top" for automobiles.

Other speakers included E. Griffiths, G. H. Welch, R. S. Teetsell, G. A. Caldwell and L. W. Herchenroeder of Westinghouse; Nelson P. Bashor, electrical engineer, W. F. & John Barnes Co., Rockford, Ill.; Frank Glassow, application engineer, Barker-Colman Co., Rockford; Myron S. Curtis, assistant director of engineering, Warner & Swasey Co., Cleveland; W. B. Wigton, electrical engineer, Cincinnati Planer Co.; and E. E. Opel, electrical engineer, National Automatic Tool Co., Richmond, Ind.

General chairman of the forum was Don W. McGill, manager, machinery electrification, Westinghouse. Robbin S. Kersh, industrial sales manager, welcomed the group to Buffalo and was toastmaster at the annual banquet held at the close of the meeting.

Calendar of Meetings . . .

May 3-5, Industrial Furnace Manufacturers' Association: Convention, The Homestead, Hot Springs, Va. Association headquarters are at 420 Lexington Ave., New York.

May 3-7, American Foundrymen's Association: 1948 foundry congress and show, Philadelphia.

May 6-7, National Highway Users Conference: Second highway transportation congress, Mayflower Hotel, Washington. Group's director is Arthur C. Butler, National Press Bldg., Washington.

May 7, Illinois Institute of Technology: Symposium on numerical methods of analysis, on its Chicago campus.

May 10-12, Canadian Association of Equipment Distributors: Fifth annual convention, General Brock Hotel, Niagara Falls, Ont.

May 11-12, American Steel Warehouse Association: 39th annual meeting, Drake Hotel, Chicago. Association president is Walter S. Doxsey, 442 Terminal Tower, Cleveland.

May 13-14, American Management Association: Production conference, Palmer House, Chicago. Association headquarters are at 330 W. 42nd St., New York.

May 14-23, Buffalo Chamber of Commerce: Buffalo industrial progress exposition, 65th Regiment Armory, Buffalo. Chamber headquarters are at 238 Main St., Buffalo.

May 15-22, International Petroleum Exposition: Texas Bldg., Tulsa, Okla.

May 16-22, Chamber of Commerce of the United States: World Trade Week. Associated with the promotion of the week is Kenneth H. Campbell, manager of Foreign Commerce Department.

May 19, Bituminous Coal Research Inc.: Annual meeting, Columbus, O. Group's headquarters are at 912 Oliver Bldg., Pittsburgh.

May 20-21, National Welding Supply Association: Annual convention, Sheraton-Coronado Hotel, St. Louis. Association headquarters are at 505 Arch St., Philadelphia.

May 20-21, Society of the Plastics Industry: Annual meeting, Atlantic City, N. J. Society headquarters are at 295 Madison Ave., New York.

May 26-27, American Iron & Steel Institute: 56th general meeting, Waldorf-Astoria Hotel, New York. Institute headquarters are at 350 Fifth Ave., New York.

May 27-29, Automotive Engine Rebuilders Association: 1948 annual convention, Hotel Statler, Buffalo. Association headquarters are at 415 N. Capitol Ave., Indianapolis.

A SPECIAL REPORT BY THE EDITORS OF STEEL MAY 3, 1948

SCRAP

Critical National Resource

Once a stepchild of industry, this vital raw material assumed top importance in war and postwar period. Reservoir depleted by exports and high consumption. Now a limiting factor in steelworks and foundry operations, it is one of industry's most difficult problems

IRON AND STEEL SCRAP has taken on a new importance since Pearl Harbor. Once it was taken for granted. Supply was always equal to demand and the material was of interest chiefly to the men who collected and sold it and to the steel mills and foundries which used it. But in the past seven years national consciousness of scrap has been heightened by its scarcity.

Scrap has become a limiting factor in steel production. Several million tons of ingot output were lost last year because mills could not obtain enough good scrap. The supply of scrap helps determine how many automobiles, refrigerators, freight cars, farm implements can be built, how many hairpins can be manufactured. It is a dominant factor in the size of finished steel shipments to metalworking companies each month. It is a matter of concern not only to the dealers and brokers, to the steelworks and casting shops, but to all metalworking industry using steel as a raw material, to statesmen concerned with the national security, and to all persons who want to buy new goods made of steel.

Particularly to metalworking executives has scrap taken on a new interest. Before the war it was a by-product of not too great value, and occasionally an actual nuisance. At today's prices it has become a valuable "crop". In some cases it has become a lever by which steel users can obtain larger tonnages of urgently needed steel.

Almost everyone in the metalworking industry is, or should be, interested in helping obtain the prompt return of scrap to steel mills and foundries. Recognition of this fact is evidenced by the large number of scrap campaigns or drives organized by not only steel producing and foundry groups, but by automotive companies, railroads, and many other consumers of steel.

Prior to World War II, scrap seldom offered a serious supply problem. A fairly large reservoir always was available on the farms and in remote areas that could be attracted out by jacking up the price a dollar or two a ton to make collecting and transporting the material to consuming centers economically attractive. An increase in prices was followed by an increased flow of material to the mills. When demand was satisfied, the price dropped and collections and shipments from the more remote areas fell off until a new surge of demand boosted prices again.

What has caused the present shortage? There are four principal reasons:

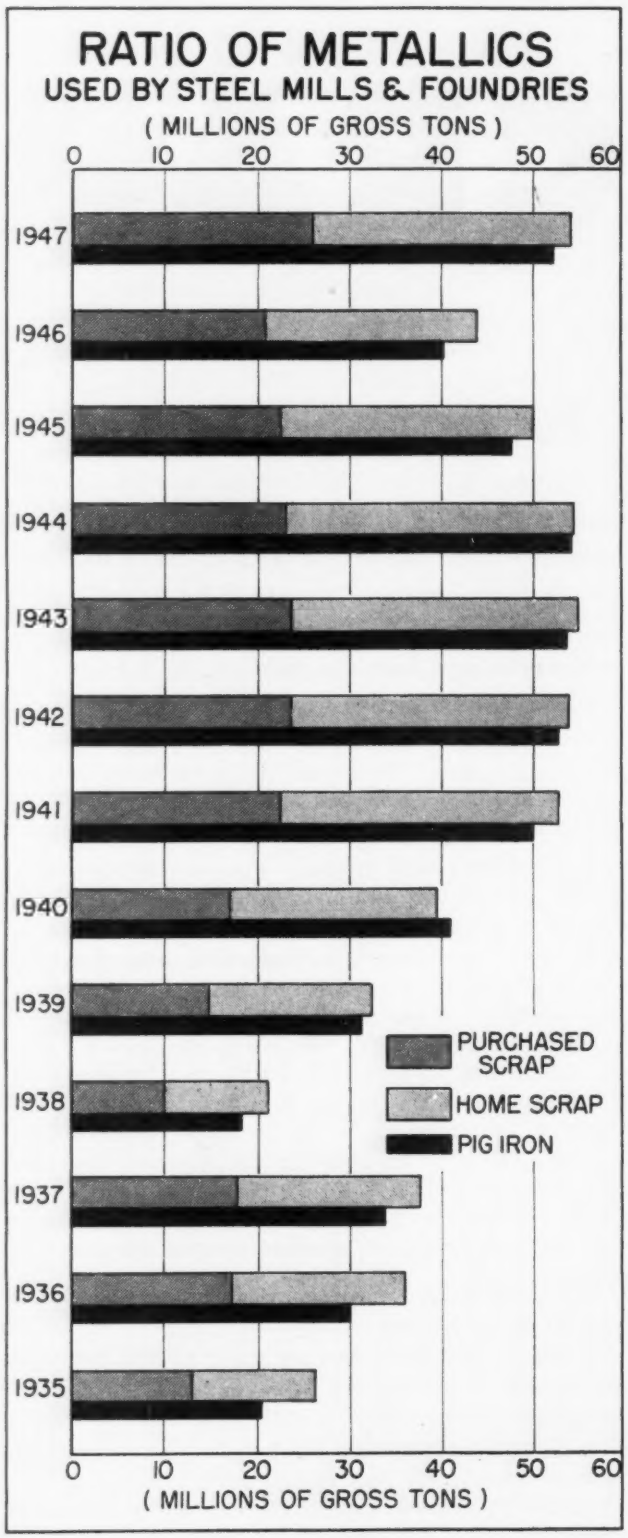
1. From the early thirties until 1940 more than 20 million tons of scrap were exported to foreign countries, chiefly Japan, Italy and Great Britain.

2. In the early forties steel and foundry capacity was expanded and was operated at capacity. Consumption increased sharply, lowering the reservoir of supply.

3. During and since the war, the scrapping of automobiles and other items made of iron and steel has declined sharply due to the unavailability of replacements.

4. During the war an estimated 124 million tons of steel were shipped abroad, as lend-lease equipment and munitions for our allies and as material and equipment for our own fighting forces.

The first major scrap crisis occurred early in the war, in 1942. Steel mills, foundries and metalwork-



Metallics used by steel mills and foundries are scrap and pig iron, usually in about equal proportions but with scrap holding a slight edge over the years. Some melting units can use all scrap or all pig iron, but the majority are geared to the use of both. When the price of scrap is low in relation to pig iron, the tendency is to increase the scrap charge. Figures compiled by Bureau of Mines

ing plants were going all out to produce the implements of war. Scrap was under government imposed price ceilings which obstructed the normal procedure of attracting out more material by raising prices to encourage collections and shipments from remote areas.

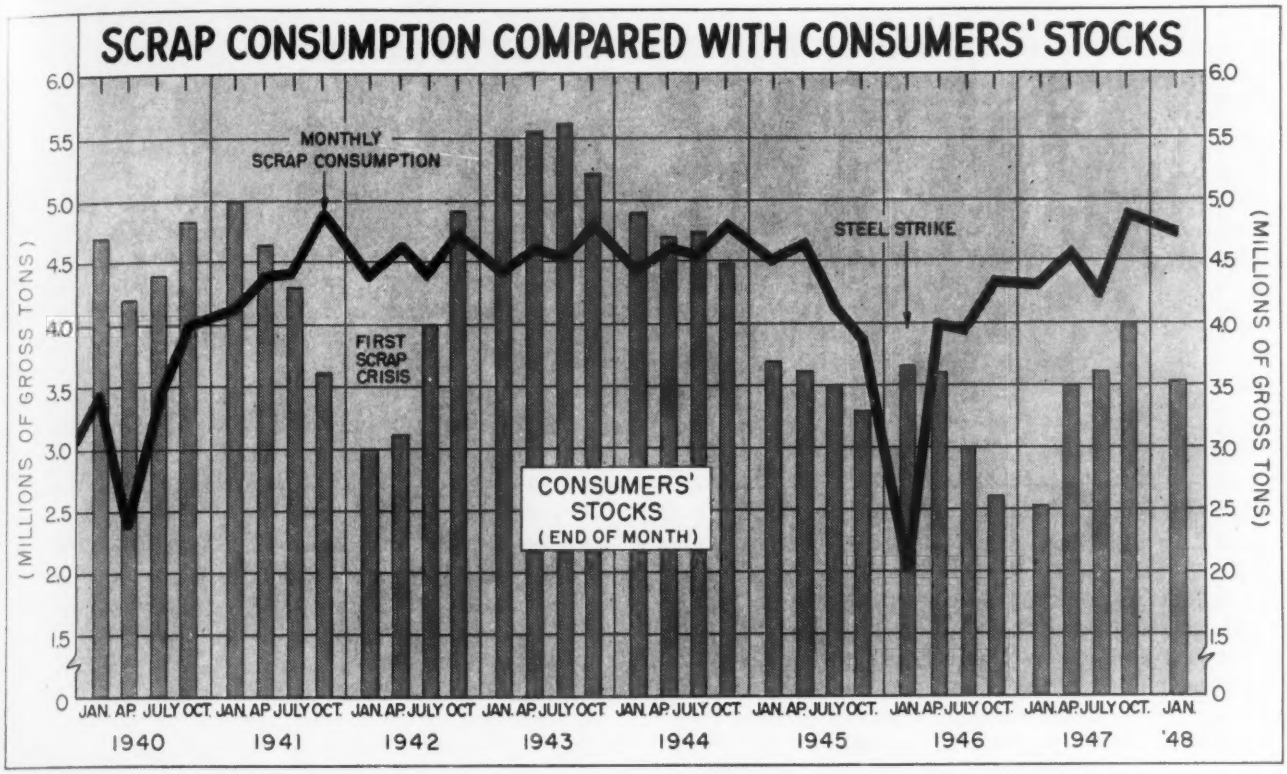
The shortage of 1942 was met by national salvage campaigns. Sparked by patriotic motives, citizens combed their attics and basements and garages and piled old flat irons, golf clubs and bed springs in public collection depots. Industrial establishments staged cleanup campaigns. Abandoned trolley tracks were torn up by municipalities. Cannon of other wars were taken out of public parks and sent back to the steel mills and foundries. Farmers found that rusty old rolls of discarded fencing which had been dumped in ravines some years before had a market value. Some of the scrap thus gathered was of doubtful quality, but enough usable material was collected to avert the crisis temporarily.

The next serious supply problem appeared in 1945 and continued through 1946. Scrap prices still remained under OPA ceilings and consumers' stocks averaged less than one month's supply. When price control was lifted in the fall of 1946, quotations surged upward and some scrap was attracted out from remote areas. Stocks were lifted moderately, but consumption was zooming along at such a high rate and the reservoir had been so drained during the war that the supply problem remained.

Consumers' stocks today are equal to only about 3½ weeks' consumption. January 1948 stocks were lower than at any time during the war with the

SCRAP CONSUMPTION AND OUTPUT OF IRON ORE, PIG IRON AND STEEL INGOT

Year	SCRAP (Gross Tons)	Iron Ore (Gross Tons)	Pig Iron & Ferroalloys (Net Tons)	Steel Ingots (Net Tons)
1947.....	54,106,000	93,248,000	59,209,730	84,787,501
1946.....	44,182,242	70,843,000	45,318,494	66,602,706
1945.....	50,170,612	88,376,393	54,919,029	79,701,648
1944.....	54,776,072	94,117,705	62,866,198	89,641,600
1943.....	55,045,495	101,247,835	62,769,947	88,836,512
1942.....	53,808,171	105,526,192	60,903,304	86,031,931
1941.....	52,871,657	92,499,000	56,686,604	82,839,259
1940.....	39,758,635	73,859,821	47,398,529	66,982,686
1939.....	32,434,407	51,829,600	35,677,097	52,798,714
1938.....	21,344,934	28,447,282	21,460,164	31,751,990
1937.....	38,006,272	72,093,548	41,582,550	56,636,945
1936.....	36,358,133	48,788,745	34,752,689	53,499,999
1935.....	26,415,330	30,540,252	23,937,423	38,183,705
1934.....	18,800,000	24,587,616	18,075,202	29,181,924
1933.....	17,400,000	17,553,188	14,947,074	26,020,229
1932.....	10,000,000	9,846,916	9,835,227	15,322,901
1931.....	18,300,000	31,131,502	20,637,516	29,058,961
1930.....	26,600,000	58,408,664	35,562,429	45,583,421
1929.....	37,600,000	73,027,720	47,727,661	63,205,490
1928.....	34,000,000	62,197,088	42,734,400	57,729,481
1927.....	30,700,000	61,741,100	40,953,522	50,327,407
1926.....	32,200,000	67,623,000	44,097,456	54,089,014
1925.....	30,700,000	61,907,997	41,104,634	50,840,747
1924.....	26,200,000	54,267,419	35,174,485	42,483,772
1923.....	27,000,000	69,351,442	45,204,483	50,336,940
1922.....	23,700,000	47,128,527	30,486,292	39,875,277
1921.....	12,400,000	29,490,978	18,690,701	22,157,853
1920.....	26,000,000	67,604,465	41,357,105	47,188,886
1919.....	20,700,000	60,965,418	34,737,208	38,831,779
1918.....	25,400,000	69,658,278	43,741,201	49,797,923
1917.....	26,800,000	75,288,851	43,255,762	50,467,880
1916.....	23,400,000	75,167,672	44,166,973	47,906,522
1915.....	18,600,000	55,526,490	33,506,159	36,009,161
1914.....	12,200,000	41,439,761	26,132,113	26,334,594
1913.....	15,300,000	61,980,437	34,682,090	35,056,979
1912.....	16,100,000	55,150,147	33,294,169	35,001,459
1911.....	12,100,000	43,876,552	26,487,493	26,517,238
1910.....	13,100,000	57,014,906	30,579,995	29,226,309



Acute scrap shortage and low inventories prevalent since 1945 are depicted by the monthly consumption and consumers' stocks figures compiled by the Bureau of Mines. First major scrap crisis occurred in 1942; a national salvage campaign helped draw out scrap and provide fairly comfortable stocks for the next two years. During the past year and a half, even the incentive of high prices has failed to attract out material, indicating the national reservoir has been lowered to a dangerous point

exception of a brief period during the crisis of 1942. Consumption is near the wartime peaks.

Steel men consider the scrap supply problem one of the most difficult facing the industry today. They estimate that 3 million additional tons of ingot could have been produced in 1947 had enough good scrap been available. Until the flow of scrap improves, they say, it is futile to talk of building new steel producing capacity; present capacity is not being fully utilized for lack of metallics—scrap and pig iron.

Should this country become involved in another war emergency, the whole metallics supply problem would become tremendous. The visible supply of metallics—scrap and pig iron—on Jan. 31 was 4,259,000 gross tons. At the time of Pearl Harbor the visible supply was 7,847,000 gross tons. Giving effect to the increased requirements, the visible supply of metallics today is less than one-half what it was when World War II started.

What can be done to improve the scrap supply situation? This problem has been receiving the attention of some of the best minds in the steel, foundry, and scrap industries and in the government. A number of proposals have been advanced, which if followed, will ameliorate the situation, although none promises immediate and complete relief. These proposals will be reviewed later, but first lets take a closer look at scrap—what it is, where it comes from, where it is used and how a unique industry has developed around this material.

What Is It?

The War Production Board wrote a definition of scrap as follows: "All ferrous materials, either alloyed or unalloyed, of which iron or steel is the principal component, which are the waste of industrial fabrication or objects that have been discarded on account of obsolescence, failure or other reasons."

To the people who deal in scrap and to those who use it the WPB definition appears legalistic and too prosaic. To them, scrap is a vital raw material in the industrial economy, to be reborn in the steel furnace or foundry cupola and become the shiny new automobiles, the gleaming household appliances, the handy shop tools or possibly the guns and tanks and aircraft engines to defend a nation.

Scrap supplies approximately one half the metallics for all steel produced in this country, the other half coming from pig iron. Scrap and pig iron are complementary metallics and the ratio in which they are used in the furnaces often can be shifted, depending on price and on which is more readily available.

Iron and steel scrap is classified into two divisions—home and purchased. Home scrap is the waste or by-product that occurs in steel plants and foundries

RATIO OF SCRAP TO PIG IRON CONSUMED

(All Types of Furnaces—Gross Tons)

YEAR	Purchased Scrap	%	Home Scrap	%	TOTAL SCRAP	%	PIG IRON	%
1947	26,066,000	24.5	28,040,000	26.4	54,106,000	50.9	52,206,000	49.1
1946	20,435,000	24.5	23,001,000	27.6	43,442,000	52.1	39,949,000	47.9
1945	22,527,126	23.7	27,643,486	28.3	50,170,612	51.5	47,488,551	48.5
1944	23,145,723	21.2	31,631,437	29.0	54,777,160	50.2	54,421,861	49.8
1943	23,762,379	21.9	31,283,116	28.7	55,045,495	50.6	53,852,820	49.4
1942	23,621,000	22.0	30,441,000	28.5	54,062,000	50.5	52,905,000	49.5
1941	22,599,622	22.0	30,272,035	29.4	52,871,657	51.4	50,165,600	48.6
1940	17,394,597	21.5	22,364,030	27.6	39,758,627	49.1	41,237,348	50.9
1939	14,914,857	23.4	17,519,550	27.4	32,434,407	50.8	31,457,767	49.2
1938	10,023,593	25.2	11,321,341	28.5	21,344,934	53.7	18,504,349	46.3
1937	18,135,239	25.2	19,871,033	27.6	38,006,272	52.8	34,056,527	47.2
1936	17,456,744	26.3	18,901,389	28.4	36,358,133	54.7	30,098,634	45.3
1935	13,068,578	27.9	13,346,752	28.4	26,415,330	56.3	20,620,463	43.7

in the manufacturing processes and generally is used in the same plant where it originates. Ingots are cropped at the top to remove the impurities which tend to rise there. The crop, perhaps 15 or 20 per cent of the ingot's weight, becomes home scrap and is charged back into the steelmaking furnaces. As the ingot is reduced to semifinished and finished steel products, further cropping is necessary. In foundries, gates or risers supply home scrap, as does spilled metal and other forms of waste.

Purchased scrap, also known as open market scrap, is the waste or by-product of fabricating operations or the result of obsolescence. It is purchased scrap in which the chief interest centers. It is more flexible in supply than home scrap, which occurs in about the same ratio to production (about 26 per cent in steel mills) at all times.

Purchased scrap generally is collected, prepared, stocked and shipped to consumers by scrap dealers. That this amounts to big business is indicated by the 1947 consumption of purchased scrap, which reached an all-time record of 26 million tons. Present price of around $40 a ton for heavy melting steel at leading consuming centers, indicates business at a rate of a billion dollars annually.

Incidentally, scrap men point to the record shipments of purchased scrap in 1947 and question the use of the term "shortage of scrap supply". They contend that "excess of demand" would be more appropriate.

Where Does It Originate?

Largest source of purchased scrap is the metalworking industry. Normally about 40 per cent of purchased scrap is industrial or factory scrap resulting from waste in industrial operations. Between 10 and 12 per cent of the weight of finished steel shipped to metalworking plants ends up on the scrap pile. In wartime this percentage rises to 15 or 18 per cent on account of more exacting standards for war goods. In the current period of acute steel scarcity, the percentage of steel going to scrap may be less than normal on account of the more careful use of steel.

Normally, about three months elapse from the time steel is shipped to a consuming plant until the industrial scrap is returned to the mill. Part of the present scrap drives are aimed at speeding up this cycle and obtaining more prompt returns.

Second largest source for purchased scrap are the railroads. Rails, rolling stock, fastenings, bridges, roundhouse and repair shop equipment require large tonnages of steel. These in time become the victims of obsolescence, accident and just plain wear.

Railroad scrap generally commands a premium over other grades and is preferred by some users. During recent months, stories have been heard of old rails being sold for scrap for more than original cost.

CONSUMPTION OF PURCHASED SCRAP BY GRADES IN 1947

Eight months only, April, May, June, and July not available. By Bureau of Mines

	Gross Tons	% of Total
No. 1 heavy melting steel	2,613,053	17.2
No. 2 heavy melting steel	3,305,425	21.8
Bundles	2,033,299	13.4
Low phosphorus scrap	1,527,072	10.0
Cast iron scrap other than borings	1,858,438	12.2
Turnings, borings, alloy free	1,482,480	9.7
Rails, scrap	196,789	1.3
Rails, rerolling	422,895	2.7
Stainless steel	55,954	0.5
High speed steel	4,667	0.1
All other iron and steel alloy scrap	198,051	1.3
All other prepared scrap	829,685	5.5
Unprepared scrap	656,094	4.3
Total	15,183,902	100.0

Third largest source for purchased scrap probably is automobile scrapping. From 1925 through 1947, scrappage of motor vehicles totaled 43,647,000 units, an average of 1,898,000 a year. The average passenger car will yield 1100 to 1200 pounds of steel scrap plus about 400 pounds of cast iron.

After old autos, the 6 million farms probably supply the most dealer scrap. Farms are an especially good source for cast iron scrap.

Other sources are public utility companies, shipbreaking, demolition of buildings, the petroleum industry and coal and metal mines. Shipbreaking becomes a major source for a few years after a war, just as shipbuilding becomes a major outlet for steel products during a war. The metalworking industry supplies substantial obsolescent scrap in old ma-

chinery and equipment. In general, the steel industry's best customers also are its largest suppliers of steel scrap.

Where Does It Go?

Bulk of purchased scrap is used in open hearth furnaces. Fifteen and a half million tons of the 26 million tons of purchased scrap consumed last year were melted in open hearths.

Second largest consumers are the foundry cupolas which used a little less than 5 million tons last year. Electric furnaces rank third, taking almost 3 million tons in 1947.

Blast furnaces used more than a million tons. The remainder went to air furnaces, bessemer converters, ferroalloy furnaces and miscellaneous uses.

Steel scrap is practically universally a part of the charge of open hearth furnaces. Normally, there are three reasons for this. First is cost. Over a period of years, scrap has been cheaper than pig iron and a ton of good scrap provides at least as much metallics as a ton of pig iron.

Second is conservation. About 3¾ tons of iron ore, coal, limestone and other materials are required to make a ton of pig iron. The use of one ton of scrap in place of a ton of pig iron saves 3¾ tons of valuable natural resources.

Third reason is speed. Steel scrap already has been refined once and its use cuts down the time required to make new steel.

Heavy scrap is preferred for open hearth use because it is more free of oxide than lighter material and because the charging time is less. No. 1 heavy melting steel, ¼ inch or more thick, not over 18 inches wide and not more than 5 feet long, cut to lie flat on the charging box, is a preferred grade. No. 2 heavy melting steel, ⅛ inch or more thick, also is used in large quantities and now commands the same price as No. 1. These two grades account for about two fifths of all purchased scrap.

In recent years, the trend toward use of light steel products has given rise to the problem of more light scrap. Bundling, compressing and similar operations have made possible the preparation of this scrap into compact masses which make satisfactory charges. Light sheet scrap generally is compressed into bundles weighing at least 75 pounds per cubic foot. Bundles account for 11 or 12 per cent of the total of purchased scrap.

Machine shop turnings, the shavings that result from the various machining operations on steel, are a leading grade of factory scrap. Often these are crushed and used to fill the interstices in heavy melting steel. Borings are the opposite number of turnings, are most often used in the blast furnace.

No. 1 busheling, clean steel scrap 1/16 inch or more thick and not exceeding 12 inches in any dimension, including sheet clippings, stampings, etc., now commands the same prices as the heavy melting grades.

Electric furnaces require steel scrap of very low phosphorus and sulphur content, preferably 0.04 max.

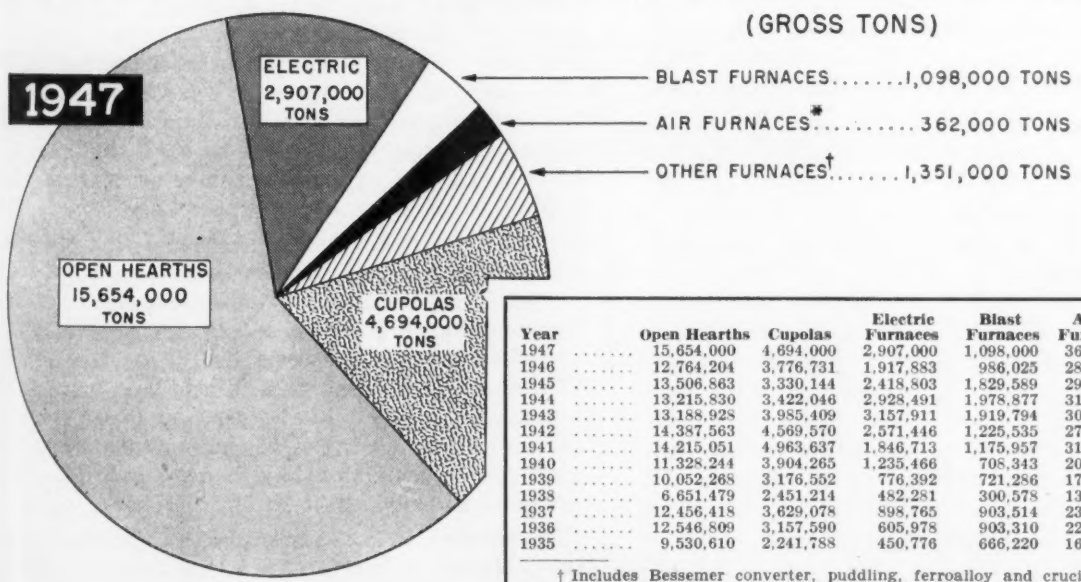
About one-fifth of the purchased scrap used in this country last year went to the cupolas of the gray iron foundries, which generally use 60-70 per cent scrap and 30 to 40 per cent pig iron. These can use a variety of iron and steel scrap, provided the composition is available. Grades to be used will depend upon availability and kind of casting desired.

Blast furnaces can use nearly any scrap that is of a size to go through the bell mechanism and can

Open hearth furnaces consume the bulk of purchased scrap, with cupolas, electric furnaces, blast furnaces and air furnaces following in order. Approximately an equal amount of home scrap is used. Figures by Bureau of Mines

CONSUMPTION OF PURCHASED SCRAP BY TYPES OF FURNACES

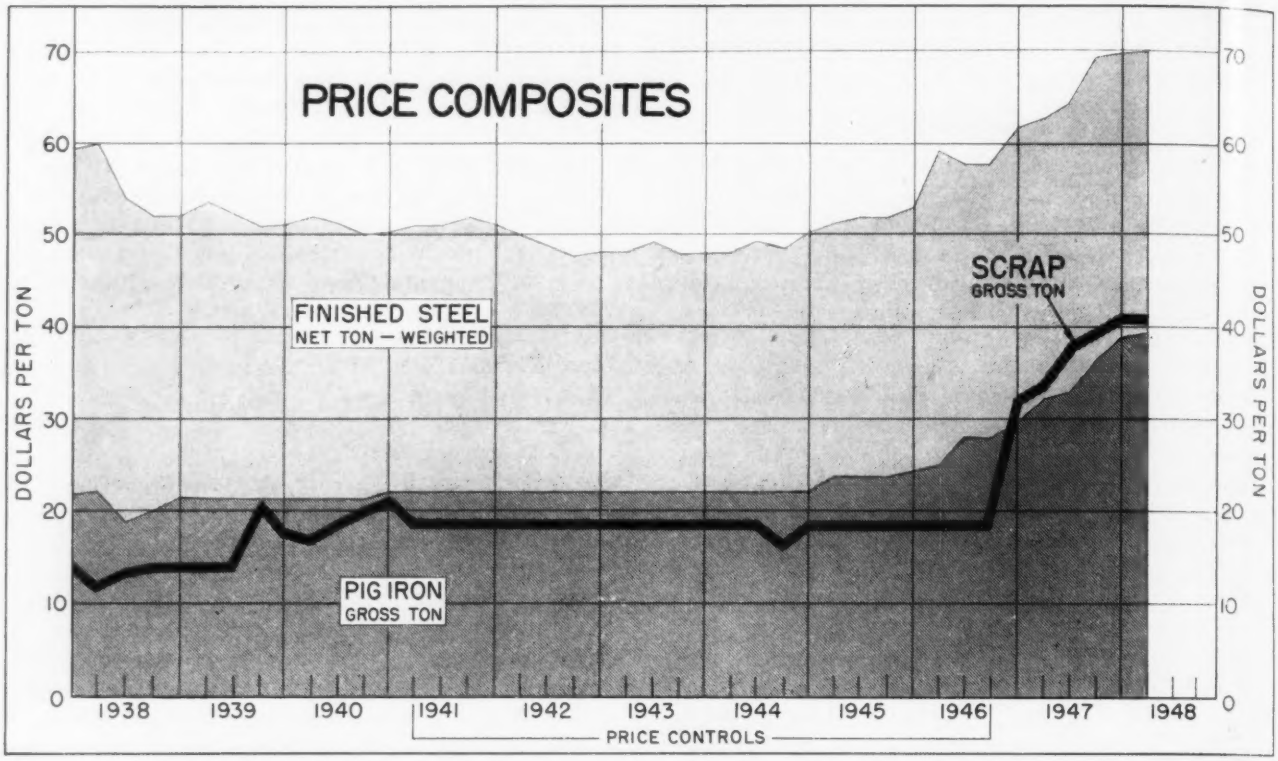
(GROSS TONS)



Year	Open Hearths	Cupolas	Electric Furnaces	Blast Furnaces	Air* Furnaces	Other† Furnaces
1947	15,654,000	4,694,000	2,907,000	1,098,000	362,000	1,351,000
1946	12,764,204	3,776,731	1,917,883	986,025	282,674	1,120,651
1945	13,506,863	3,330,144	2,418,803	1,829,589	293,596	1,149,131
1944	13,215,830	3,422,046	2,928,491	1,978,877	315,415	1,285,064
1943	13,188,928	3,985,409	3,157,911	1,919,794	302,831	1,207,500
1942	14,387,563	4,569,570	2,571,446	1,225,535	279,701	685,175
1941	14,215,051	4,963,637	1,846,713	1,175,957	311,987	86,277
1940	11,328,244	3,904,265	1,235,466	708,343	202,015	16,264
1939	10,052,268	3,176,552	776,392	721,286	176,786	11,573
1938	6,651,479	2,451,214	482,281	300,578	130,798	7,243
1937	12,456,418	3,629,078	898,765	903,514	231,221	16,243
1936	12,546,809	3,157,590	605,978	903,310	223,154	19,903
1935	9,530,610	2,241,788	450,776	666,220	168,103	11,081

† Includes Bessemer converter, puddling, ferroalloy and crucible furnaces and miscellaneous uses.

* Includes Brackelsberg furnaces.



Acute shortage of and high demand for scrap since the war is reflected in the sharp increase in prices immediately after the removal of wartime price controls. Normally the composite scrap price is several dollars a ton below that of pig iron. Since the beginning of 1947, scrap has commanded the higher price. Composite price figures by STEEL

salvage iron materials which are impractical in any other furnace. The scrap charge in a blast furnace is an economic problem and depends on price.

Although the bulk of purchased scrap goes to steel and foundry furnaces and cupolas, there are certain miscellaneous uses. Outstanding among these is the rerolling of old rails into concrete reinforcing bars, merchant bars or other products. Normally about a half million tons of scrap rails are thus converted.

Cast iron borings of chemical quality are used in the manufacture of medicines, paints, explosives, dyes, iron oxide, aniline oil and other chemicals.

The Role of the Scrap Man

Collecting scrap from factories, auto graveyards, farms, oil fields, and other sources, grading and preparing it for consumption in the melting unit for which it is destined and shipping it to consuming centers is the job of the scrap industry—the collectors, dealers and brokers.

There are today about 4500 dealers in scrap. Employment of the industry totals about 200,000.

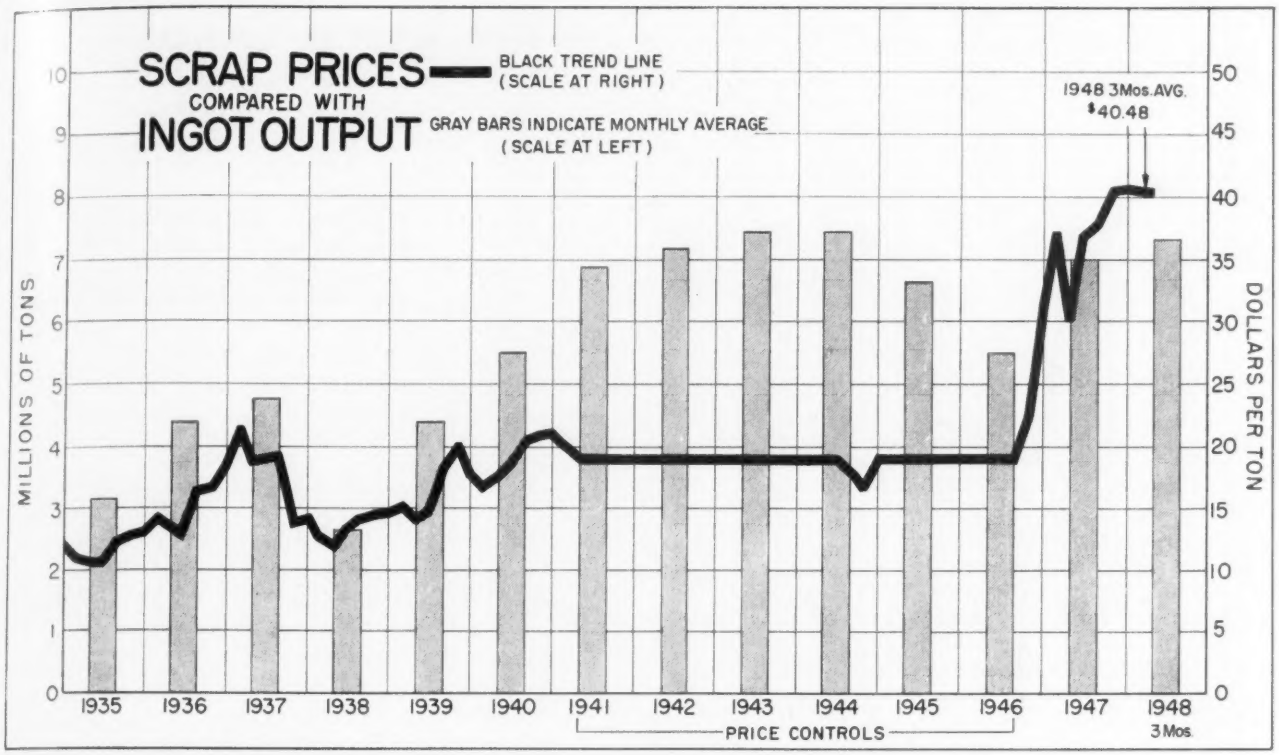
It is the outstanding supplier to the iron and steel industry that has not been integrated. Steel mills own their own coal mines, iron ore deposits, limestone quarries, lake and ocean vessels to haul raw materials to the mills, and sometimes railroads. But they still buy their scrap from dealers who have no connection with the industry other than a buyer-seller relationship.

Historically, the first recorded use of iron scrap in America is believed to have occurred in 1642, when a Massachusetts iron worker at Saugus, Mass., poured a three-legged kettle or pot. From this start the scrap industry grew slowly along with the development of the early iron industry.

The economic and social turmoil of Europe in the 1840s brought to this country many immigrants who lacked a trade or inclination for agriculture. To earn a living in the new land, some of these became peddlers who made forays into the rural districts, either with packs on their backs, or if they had sufficient capital, with a horse and wagon. They carried whatever wares were in demand in the districts in which they traveled. Since money was scarce, many of the transactions were on a barter basis. The peddler offered the housewife needles, tinware, thimbles, eyeglasses and such commodities in return for old rags, bottles, bones, hides and, of course, scrap iron. Some of the oldest and best known firms today can trace their beginnings back to such origins.

With the growth of the iron and steel industry, the scrap industry kept pace. By 1900, when reliable statistical records were established, the consumption of iron and steel scrap had risen to more than 5 million tons annually. In the peak scrap consumption year of 1943, more than 55 million tons were used. Last year consumption totaled more than 54 million gross tons, including home and purchased scrap.

In addition to collecting, processing and shipping scrap, the dealer performs another function—that of maintaining inventories for the steel mills and found-



An axiom in the industry is that scrap is never sold, is always bought. This is borne out in the comparison of ingot operations and scrap prices which shows scrap prices, in a free market, rise in periods of high steelworks operations, decline in periods of low operations. During the war, of course, government ceilings were enforced on scrap prices

ries. Broadly speaking, the dealer is always in the market for unprepared scrap. When demand and prices are low, he buys substantial tonnages of this material which accumulates in his yard until demand rises. Then it is prepared and shipped to the consuming plants.

Ordinarily steel mills and foundries do not carry more than a 60-day stock of scrap. Were it not for the scrap dealer, consuming mills would have to buy scrap far in advance and carry much larger stocks.

The dealer may act in a dual capacity as processor and broker, taking orders directly from a consumer, filling part of it from his own operation and buying the remainder from other dealers.

Most dealers, however, are primarily processors.

The broker, as such, does not operate a yard, but takes orders from consumers which he covers by purchases from dealers. In a free market, the broker normally books orders from consumers and tries to cover at a profit. This operation requires not only thorough knowledge of the market but sound judgment as to economic trends. Sharp changes in price between the time an order is booked and covered may cause a huge loss or a handsome profit.

The scrap market, which is covered by business papers in the metalworking field in all major consuming centers, is followed closely by readers. Scrap provides a moving market, whereas quotations for steel, pig iron, ore and coke change only occasionally.

Since the removal of wartime price controls, scrap prices have been extremely buoyant. Normally, scrap prices are somewhat lower than pig iron quotations, and at times have been much depressed. Currently, the better grades of scrap are selling for more than pig iron. At times, quotations for scrap have been higher than those for finished steel.

War Accents Segregation

War plays havoc with the analysis of scrap. Alloy steel is required for tanks, armor plate for ships, shell, guns, aircraft engines and other materiel. Output of alloy steel rose sharply after Pearl Harbor. This raised a new problem in scrap. How could the alloy scrap be segregated so that not only valuable alloying elements could be utilized but contamination of the next batch of iron or steel prevented.

Generally industry had lagged in developing methods for disposing of its scrap. Few plants had developed systems for segregation.

The material necessities of war focussed attention on the problem and industry working with the War Production Board devised some unique systems of color marking, code numbers and other methods to segregate scrap according to analyses.

This problem has been no less critical in the postwar scrap shortage. Proper segregation methods at the source and simple convenient collection procedures can help speed the return of scrap to consumers, enabling production of more steel, provide consumers with the analysis of the scrap, and bring the originating plant larger revenues for the by-product. Once grades of scrap are mixed, they cannot be separated

EXPORTS AND IMPORTS OF IRON AND STEEL SCRAP BY COUNTRIES

In gross tons. Includes tin plate and waste-waste tin plate. Compiled by U. S. Department of Commerce

Exports to:	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
Belgium	12,978	4,395	46,863	17,134	1,727	983	.....	.....	.....	.....	.....	.....	134
Canada	96,128	63,712	185,566	92,217	175,496	367,474	279,967	108,436	30,431	63,855	37,838	73,137	106,603
China	38,155	29,950	35,327	10,095	34,870	16,084	100	.....	.....	.....	89	2,848	5,639
Czechoslovakia	2	1	36,832	14,984	.....	.....	.....	.....	.....	.....	.....	.....	.....
Germany	4,113	6,799	88,153	230,903	16,584	.....	.....	.....	.....	.....	.....	.....	.....
Hong Kong	8,486	3,216	2,854	5,095	4,954	248	1,319	.....	.....	.....	.....	187	2,296
Italy	382,775	285,126	381,394	434,717	425,896	319,309	.....	.....	.....	.....	.....	.....	471
Japan	1,117,973	1,057,621	1,904,768	1,381,801	2,026,854	962,898	289	.....	.....	.....	.....	.....	.....
Kwangtung	6,058	1,603	3	1,985	9,700	.....	.....	.....	.....	.....	.....	.....	.....
Mexico	41,436	33,678	61,351	21,301	37,150	37,556	26,765	13,841	16,213	15,632	21,900	42,531	30,338
Netherlands	9,055	4,777	143,401	206,554	54,165	147	.....	.....	.....	.....	.....	.....	328
Poland and Danzig	36,627	31,104	275,337	151,451	147,596	.....	.....	.....	.....	.....	.....	.....	.....
Sweden	2,162	15	30,596	1	65,483	12,413	.....	.....	.....	.....	407	.....	2,186
United Kingdom	277,366	364,874	845,216	387,347	508,293	982,831	481,790	127	104	.....	159	.....	126
Others	70,645	49,261	54,929	43,006	78,359	120,225	2,530	4,069	2,209	5,943	15,925	2,976	25,292
Total	2,103,959	1,936,132	4,092,590	2,998,591	3,577,427	2,820,789	792,760	126,473	48,957	85,430	76,318	121,679	173,413

Heavy exports of iron and steel scrap during the 1930's, chiefly to Japan, Italy and the United Kingdom, started a drain on the United States reservoir that is now regretted. At the time, few people could foresee a scrap shortage in this country. Imports from other countries have not been of much consequence. Figures by Department of Commerce.

Imports from:	1939	1940	1941	1942	1943	1944	1945	1946	1947
Algeria	.....	.....	.....	.....	545	50	.....	.....	.....
Australia	.....	.....	.....	.....	250	.....	.....	11	.....
Bahamas	.....	.....	.....	.....	545	342	.....	26	63
Bermuda	.....	.....	657	867	161	.....	30	.....	161
British Guiana	.....	.....	.....	2,002	.....	.....	1,460	.....	1
Canada	27,148	558	26,383	53,639	92,248	61,661	26,431	9,380	3,635
Canal Zone	.....	.....	.....	.....	6,195	13,270	.....	.....	1,192
Colombia	.....	3	3,092	1,026	.....	.....	2,363	.....	.....
Cuba	.....	.....	28,061	17,442	15,170	10,297	4,527	2,220	19,188
Curacao	.....	75	2,110	3,535	2,627	.....	3,495	4,976	4,882
Dominican Republic	95	.....	499	.....	.....	.....	1,819	94	377
Italy	8	.....	.....	.....	.....	.....	538	893	.....
Jamaica	.....	.....	.....	3,154	2,398	.....	.....	2,506	.....
Mexico	1,219	658	71	2	.....	.....	.....	40	143
Panama	.....	20	.....	7	.....	.....	.....	2	244
Sweden	497	273	.....	4	.....	.....	.....	.....	70
United Kingdom	424	92	21	5	981	2	5	176	667
USSR	.....	.....	216	289	1,116	165	54	.....	.....
Venezuela	.....	.....	.....	.....	.....	.....	108	6,653	.....
Other Countries	41	248	2,975	285	5,782	1,375	483	7	1,685
Total	29,432	1,927	64,085	82,257	128,018	97,162	41,313	26,984	32,308

except at considerable cost. Time is lost in returning the scrap to the mills and the revenue to the originator is lower.

Overseas Scrap

The acute need for scrap to maintain steel production and the low inventory prevalent in the country since the end of the war have focussed attention on the possibility of increasing our supply by the return of scrap from overseas.

Various moves have been instigated to more fully investigate the feasibility of returning overseas scrap. The Steel, Foundry & Scrap Industries' Committee for Expediting Iron & Steel Scrap, comprising representatives of the consuming groups mentioned, has been actively working on the problem as liaison between government and industry.

Last December a scrap mission, including representatives of the consuming industries, the Department of Commerce, Department of State and the Army went to Europe to investigate at first hand the possibilities of exporting scrap from bizonal Germany. The mission reported nearly 10 million tons of rubble scrap, two thirds of which is of railway, bridge and industrial type and readily accessible.

The mission said numerous obstacles must be overcome before this 6 million tons of scrap could be exported. Prominent among these is the reluctance of the Germans to allow the scrap, regarded as a German war potential, to leave the country.

Substantial tonnages of scrap are under the custody of General Douglas MacArthur in Japan. While no official estimate has been made of the amount, unofficial estimates place it as high as 7 million tons.

As much as one million tons of scrap is reported in the Philippine Islands.

Government surplus property inventories in this country hold substantial tonnages of ferrous material, which consuming groups have asked to be released.

Consumers generally have been critical of the government's caution in promoting the return of overseas scrap to this country and in releasing surplus material for scrapping.

A representative of the Steel, Foundry & Scrap Industries joint committee recently said:

"It is still not too late for the executive department and/or the Congress to take steps to replenish this country's depleted ferrous scrap reservoir. Several sources of accessible stocks of iron and steel scrap, of substantial quantity and fair quality, still remain available or can be made available should our government exercise prompt, energetic and aggressive action to obtain them by all the means and powers at its command.

"In this regard I should point out that other governments, notably Great Britain and Russia, have not been so reticent as has been the United States.

"Indeed, it would appear that unless we in the United States take prompt action to acquire the substantial tonnages of scrap iron now available in overseas areas, we may soon find that they are unavailable to us by reason of having been absorbed by other nations—not all of whom may be considered friendly to the United States."

Grant Higher German Coal, Metals Prices

DUSSELDORF, GERMANY

TWO IMPORTANT price increases were recently announced by the Anglo-American Control Council for Bizonia: Price of coal was raised from 15 reichsmarks to RM 25 a ton; and raw steel price was advanced by RM 66.45. Pig iron, rolled steel products and nonferrous metals were increased accordingly.

That steel and coal prices up to this change were insufficient and necessitated heavy governmental subsidies was widely recognized, but delaying and hampering tactics by the Russians prevented any adjustment. Under the Potsdam agreement price increases in Germany had to be authorized by a unanimous vote of all occupying powers. It was not until the breakdown of the four-government control council in Berlin that the increases could be granted, and then only on a bizonal basis. Adding to the speed with which the action was finally taken is the impending date of currency reform.

Prices Pegged in 1936—The actions are initial moves to bring the antiquated German price system into workable shape before that date. Until these new prices were established, German prices had remained at the 1936 level where they were pegged by the Nazis under a rigid system in support of their rearmament program.

In the case of iron and steel, under the new prices public revenues will no longer be available to continue the payment of heavy subsidies.

As to coal prices, production costs are about RM 30 a ton, as against a new price of RM 25. Subsidies will not be entirely eliminated, therefore, but will continue for three months at RM 3 a ton.

Greater Economy Sought—Production costs of coal mining are on the upgrade, partly as a result of low volume and low labor productivity and partly because of higher materials prices.

Stepping up output offers the permanent solution, and at the rate of 400,000 tons daily, costs would come down to the new RM 25 price.

The increase in steel prices is based upon use of Swedish high-grade ores in the amount of 50 per cent, and of other imported ores plus domestic.

SIGNS ERP CHARTER: Ernest Bevin, British foreign secretary, signs at Paris ceremonies the charter creating organization which will further the European Recovery Program. Fifteen other nations and Western Germany also are signers. NEA photo

British Ferrous Group To Meet

ANNUAL meeting of the British Iron & Steel Institute will be held May 5 and 6 in the Royal Institution of Chartered Surveyors, London.

The third Hatfield Memorial Lecture will be delivered by Prof. Robert F. Mehl, Carnegie Institute of Technology, Pittsburgh.

At the institute's general meeting Wednesday morning, the president, Dr. C. H. Desch, will present the Bessemer Gold Medal for 1948 to W. J. Dawson in recognition of his contributions to the development of steel castings and to the production of alloy and heat-resisting steel. The Sir Robert Hadfield Medal for 1948 will be given to A. Preece for his researches on the scaling and on the overheating and burning of steel. R. Fowler will receive the Williams prize for his paper on "Blowing Out a Blast Furnace."

Technical Papers — The following papers will be presented at the technical sessions: "Construction and Repair of Open-Hearth Furnaces," by D. C. Muir; "The Design of Open-Hearth Gas Ports," by M. P. Newby; "Installation and Use of Instruments on Open-Hearth Melting Furnace," by R. C. Baker; "The Production of Nodular Graphite Structures in Cast Irons," by H. Morrogh and W. J. Williams; "The Carbides in Iron-Carbon-Silicon Alloys and Cast Irons," by D. Marles; "Abnormal Creep in Carbon Steels," by J. Glen; "The Creep Properties of Molybdenum, Chromium-Molybdenum, and Molybdenum-Vanadium Steels," by J. Glen; "A Micro Examination of Eight Steels for the Inclusions Sub-Committee," by J. H. Whiteley; "The Study of Segregations and Inclusions in Steel by Micro-Radiography," by W. Betteridge and R. S. Sharpe; "Some Thermodynamical Aspects of the Formation of Inclusions in Mild Steel Weld Metal," by E. C. Rollason and E. Bishop; "A Comparison of Molds of Standard Composition and of Approximately Ingot Mold Subcommittee Composition," by W. L. Kerlie; "Mold-Weight/Ingot - Weight Ratio and Its Relation to Mold Consumption," by N. H. Bacon; and "Formation of 'Double Skin' or 'Curtaining' on Top-Poured Steel Ingots," by P. Walker.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

European assistance program is being well received by the public. Confidence in Paul G. Hoffman as administrator shown in rush of applicants to serve under him

PAUL G. HOFFMAN unquestionably has become—for the moment at least—Washington's No. 1 glamor boy. That is proved by the attendance at his press conferences and especially by the large number of news photographers, movie cameramen, radio wire sound recorders and so on who crowd each other in a large conference room.

It is not only because Mr. Hoffman is handsome, bronzed and youthful looking, immaculately groomed to the last detail, and because he has a warm smile and quick response and ready wit. His personal qualifications help a lot, of course, as also does the fact that he has joined the select small group that constitutes the President's cabinet.

Unprecedented Undertaking — The chief reason for his present popularity is that his government assignment, that of administrator for economic co-operation, has captured the imagination of thinking people. Underwriting the economic recovery of 16 European nations to the tune of $5.3 billion of American money for the first 12-month period is coming to be recognized as an unprecedented undertaking which calls for a type of daring that is looked upon as peculiarly American in character. And Mr. Hoffman, in the driver's seat, stands as the symbol for all that this vast program implies.

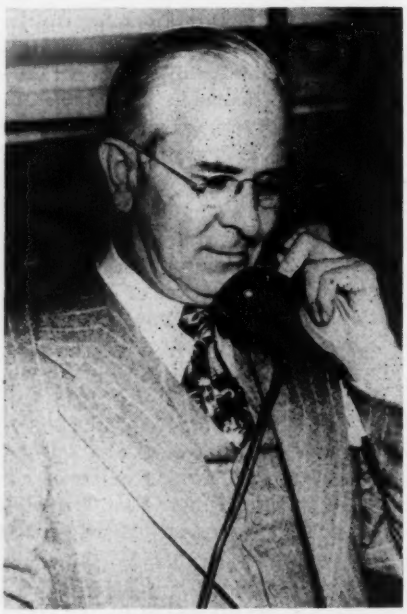
Another gage of the place of Mr. Hoffman and his Economic Co-operation Administration has assumed in the public eye is the fact that he has received more than 17,000 applications for employment at a time when such agencies as the National Resources Security Board are having a tough time trying to line up a relatively few men. Mr. Hoffman says that at least 300 of these applicants are men of high caliber and no doubt some of them will be called in. In the meantime, the "ECA"—as the Economic Co-operation Administration is called—has gotten a reputation of taking on people "by invitation only." How many employees he will need Mr. Hoffman has not yet been able to decide; right now the total staff of the ECA numbers less than 200.

Definite Programs Unshaped — So far, aside from food, definite programs remain to be shaped up—first on the basis of revised requisitions from the 16 participating nations in Europe and second by screening here in the interest of preventing damage to our economy through unduly large shipments of scarce commodities.

But on one thing Mr. Hoffman makes a definite promise: The European assistance program will not add to inflationary pressures at home.

His food expert, Dr. Dennis A. Fitzgerald, told the press representatives that total food shipments from the United States will be reduced as a result of the ECA program. Grain shipments from the United States to all foreign destinations are scheduled at around 475 million bushels in fiscal 1949. This compares with 556 millions so far scheduled for fiscal 1948 and 575 millions shipped in fiscal 1947.

Reflected Elsewhere — This same situation will be reflected in other exports, said Richard Bissell who served as executive director of the Harriman Committee on Foreign Aid and now is Mr. Hoffman's consultant on the entire program. Total exports, said Mr. Bissell to the newsmen, "will almost certainly be less than they have been in the last year." Mr. Hoffman and Mr. Bissell, in answer to questions as to the tonnages of steel and the quantities of various types of machinery and production equipment to be exported after the ECA program gets going, said that "nobody knows yet what they will be—but in general the amounts will be smaller than our recent exports."



CHARLES SAWYER

Cincinnati attorney, is the new secretary of commerce, succeeding W. Averell Harriman who has become ambassador-at-large for the European Recovery Program. NEA photo

Here are some of the points of interest to industry, as gleaned from Mr. Hoffman and others having a hand in the shaping of policies:

1—Mr. Hoffman plans to make "very considerable" use of advisory committees called in from key industries involved in the foreign assistance program. These will be in addition to the public advisory committee called for by the Foreign Assistance Act.

2—ECA will encourage dealings between private parties in the United States and the participating countries. It will seek to "minimize" the use of government procurement and other missions by the participating nations.

3—One of the principal assignments to be handed to the new "roving ambassador," W. Averell Harriman, will be to encourage trading between the participating nations so as to reduce the drain on United States suppliers. Current concept, as Mr. Bissell explains it, is that "95 per cent of the goods changing hands under the program should be exchanged among the 16 European nations, and the remaining 5 per cent, to come from the United States, should comprise those items necessary to fill in the picture."

4—ECA will seek to bring scarce materials into the United States on a larger scale, and accelerate progress under our national stockpiling program.

5—ECA will encourage American corporations to establish branch plants abroad, or acquire such plants. It will do this under its authority to guarantee rates of exchange under which Americans can exchange their foreign money, including profits, into United States dollars.

Mr. Hoffman has joined with other administration officials in planning to effect an early reduction in the present burden upon our taxpayers of our German assistance program. By stimulating German production the Germans should become self-support-

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ing on a rapidly increasing scale. Nobody knows exactly what our German program is costing us, but it generally is referred to in Washington as being in the neighborhood of $1.25 billion annually.

McCabe Takes New Course

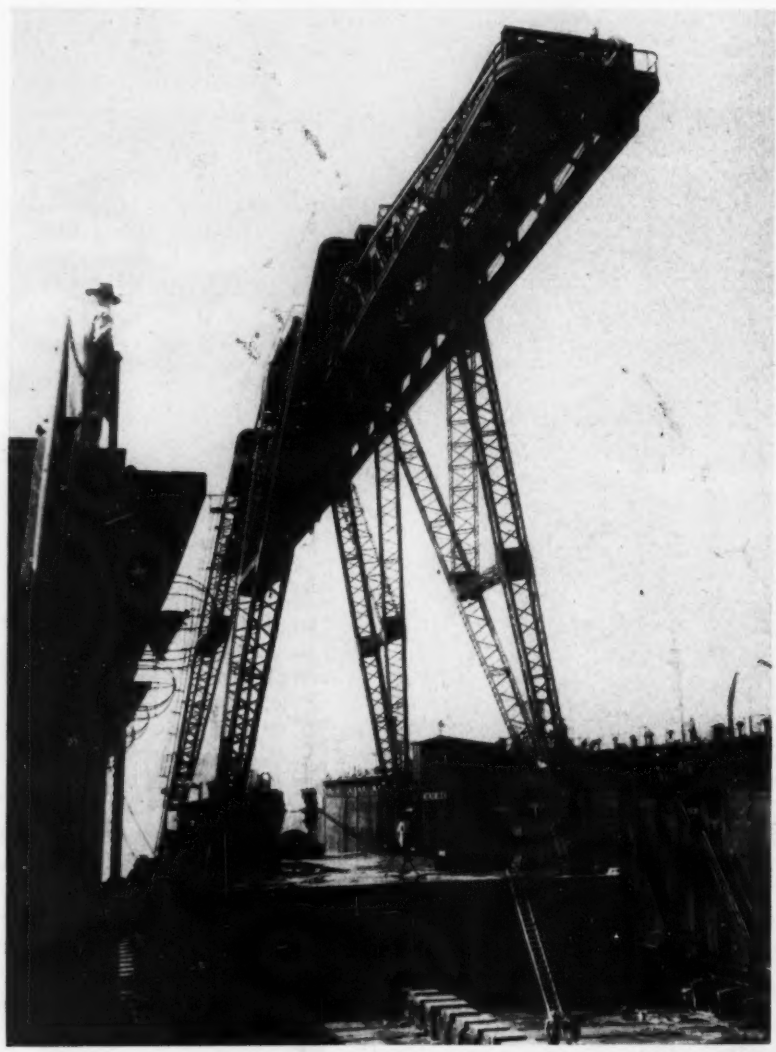
A radical change in procedure characterizes the Federal Reserve System under Thomas B. McCabe, the new chairman of its board of governors. He does not propose to have any of the fights with Congress and with other administration heads which were so frequent when Marriner S. Eccles headed the board.

Instead of setting policy in the former "ivory tower" style, Mr. McCabe is going to set them at the "grass roots" level. Already he has been to Minneapolis and St. Louis, and he proposes to get to other centers as fast as possible. His idea is that local businessmen and bankers know more about conditions and needs in their areas than "experts" at Washington. Right now he wants to find out from these people if it is true that inflation is showing renewed threats of getting out of hand. Then, if these people report inflation as looming more threateningly, he wants to know what can be done—in the localities where they live and do business, and where they understand the problems of the people—to curb the trend intelligently.

Scientific Photography

Research workers in the fields of metallurgy, crystallography, chemistry, physics, medicine, ballistics, etc., will be interested in a new Navy film described as "the first comprehensive compilation of the uses of photography, still and motion pictures, in the various fields of scientific research and development." Motion picture techniques utilized to make the presentation effective include: Time lapse, high speed, slow motion, stroboscopic, microscopic, macroscopic and underwater photography.

Entitled "Naval Photography in Science," the film was prepared under the supervision of Lt. Comdr. W. R. Cronenwett.



LOOKING FOR A LIFT?: The Hercules, former Navy floating derrick now owned by Hughes Bros., New York, towers 98 feet in the drydock at Todd Brooklyn shipyard where it is being made shipshape. The floating derrick has capacity for hoisting 230 tons, and has a 289-foot cantilever with trolley line capable of moving heavy objects such as battleship guns, locomotives, barges and tugs from one end to the other

Record-Keeping for OMD

An interpretation of the record-keeping requirements of the Office of Materials Distribution, Department of Commerce, announced by OMD, makes it clear that so far as the requirements of OMD and its predecessor agencies are concerned, records covering commercial transactions need be kept only where the transactions are less than two years old, and were subject to OMD rules and regulations. OMD's predecessor agencies were the Civilian Production Administration, the War Production Board and the Office of Production Management.

OMD orders and regulations, including those taken over from the Civilian Production Administration, are: Allocations Regulation 1; Allocations Regulation 2, and directions; Allocations Regulation 3; Conservation Orders M-43 (tin); M-81, including Direction 10 (cans); M-131 (quinidine and cinchona bark); R-1 (rubber); and M-84 (cordage) and M-393 (streptomycin). The two last mentioned orders were revoked last year.

OMD's interpretation of its requirements states specifically that it does not apply to records which may be necessary or desirable in connection with the rules, regulations or orders of any other government agency.

Internal Priorities

Reports that the Navy is ordering machine tools under a priorities system are declared by Navy spokesmen to have no foundation in fact. The only priorities used by the Navy are "internal" priorities, calling for execution of certain projects ahead of others which are of lesser importance. Such "internal" priorities, for example, recently were used by the Navy in shipping certain items required in the aid-to-Greece program. There is no authority whatever under which the government could use a priorities system in procurement, these spokesmen say.

Lone Star Plan To Diversify, Cut Costs Told

COURSE WHICH Lone Star Steel Corp., Dallas, Tex., has followed with regard to its pig iron prices and its contractual relations, and its plans to enter new fields are explained by President E. B. Germany in his first annual report to stockholders.

Since Feb. 1 the company's pig iron price has been $75 per ton, fob cars, Daingerfield, Tex., on a spot sale basis, and $60 per ton to customers making a firm contract to purchase over a 20-month period.

The higher price has been the subject of considerable criticism, Mr. Germany explained, by foundrymen, but "when we found out that other people were selling our pig iron at $75 per ton we figured that our first duty was to our stockholders, and that due to the high cost of production under the restrictions of the Sheffield coal provision and the Navy blower contract and due to our very tight financial cash position we felt we were justified," he said.

Contracts Previously Made—A number of contracts were made early in 1947 and before the starting up of the plant on Oct. 25 which "have caused us considerable concern and have materially reduced our profits," he admitted. The present management was unaware of their existence until recently but expects to deliver the full amount of the contracts although not all during the present high price period.

One such contract, with Harry Gale of Washington, is for 24,000 tons of iron to be delivered at a rate of 2000 tons a month. If the company were able to make full delivery at the present pig iron price Mr. Gale's potential profit would be about $400,000.

A contract made in March, 1947, for delivery of 105,000 tons of iron to Pittsburgh Mill Steel Co., a brokerage firm apparently owned by Alice Hansen, president, would give her a profit at today's prices of over $3,500,000 and would take more than one-third of Lone Star's production. Mr. Germany says even under the amended conditions of the deal Miss Hansen will make "a minimum of $2 million."

The company has been able to amend its contracts with these two people so that each will receive 10 per cent of the company's iron production until the contracts are filled.

In these contracts and in ones with Ford Motor Co. and United States Pipe & Foundry Co., purchase price was calculated on the Cleveland base price, which "has at times been below our cost of production and at all times has been so near our cost of production that these contracts have seriously handicapped our operation." Ford has voluntarily raised its purchase price to $50 per ton and negotiations are under way with the pipe concern for some similar modification.

Contributing also to the company's reason for charging the $75 price, Mr. Germany added, is an agreement with Henry Kaiser advancing Lone Star $500,000 in cash, needed before the furnace could be put into operation. This advance is being repaid entirely out of iron at the rate of $5 per ton, with Mr. Kaiser promised 8 per cent of Lone Star's production.

Diversification Is Aim—Mr. Germany said the unusually high market for the company's iron cannot be assumed as lasting too long. Although "we could contract for double the amount we have committed if we were certain that we could have the pig iron available," he states, "it is our belief that the present high prices will be maintained for the balance of this year, after which time if no unusual general economic recession occurs the prices will gradually drop off and reach a more normal stage by the middle of 1949." Being now limited to production of pig iron, coke and by-products only, the company expects intensely competitive conditions. "The only sure plan for making the Lone Star secure in its future operations is to complete our plant so that the pig iron we now produce can be manufactured by us into end products which are in unusual demand in this particular area," Mr. Germany contends.

Outlining the market potentials of a pipe manufacturer in the 400-mile area around Lone Star, where 80 per cent of the oil field casing and pipeline material to be bought in the United States in the next ten years will be used, Mr. Germany revealed that within a month a proposal will be made to stockholders for construction of a pipe mill with all other necessary facilities.

Facts for Industry . . .

(As reported by government agencies)

Aircraft and Engines — Manufacturers shipped 613 complete aircraft in February, compared with 607 in the previous month, but total shipments for the first two months were far below deliveries made in the similar periods of 1947 (1220 against 4290). Shipments to U. S. military customers accounted for 24 per cent of the February total; civil personal-type, 74 per cent; and civil transport-type, 2 per cent. Civil aircraft shipments totaled 466 planes with combined airframe weight of 581,000 lb, a slight decrease in number but a 23 per cent increase in weight over January. Value of aircraft engines shipped in February was $25.9 million, 10 per cent over the previous month's value. Of the total, military engines and parts accounted for $20.5 million, or 79 per cent. February total exports were 190 aircraft and 375 engines with value of $5.0 million, compared with 117 aircraft and 295 engines with a value of $4.4 million exported in January. *Census Bureau and Civil Aeronautics Administration, Commerce Dept.*

Truck Trailers — February production of truck trailers was 3667 units, a slight increase over the 3445 produced in January. The latest month's production was 44 per cent lower than for the comparable 1947 month. Shipments during the month totaled 4000 units, valued at $11.3 million. Of this total 3810 were shipped as complete trailers and 190 as trailer chassis. *Census Bureau, Commerce Dept.*

Coke from Coal-Gas Retorts — Production of coke from coal-gas retorts in 1947 declined 12 per cent from 1946 and totaled 664,576 tons. The sharp decline was due principally to substitution of water-gas, natural gas and liquified petroleum gas for coal gas at a number of installations. This replacement resulted in dismantling 729 retorts during the year to bring the total number available to 1419. Of this total only 1154 were operating on Dec. 31. Capacity of retorts in existence at the end of the year was 1,273,100 net tons of coal a year, 21 per cent below 1946 and 33 per cent below 1942. *Bureau of Mines, Interior Dept.*

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

William S. Knudsen, former president of General Motors and onetime head of War Production Board, dies. Contributed much to mass production techniques

DETROIT

CULMINATING a serious 16-month illness, death wrote "30" to the colorful career of big Bill Knudsen at the age of 69 last Tuesday. Unquestionably the greatest exponent of the application of mass production techniques to manufacturing, he came to this country from Copenhagen, Denmark, when only 19 and, after being told to "hurry up, you ....." when coming down the gangplank, commented in later years that he had been "hurrying up" ever since. It seemed he even had to hurry up to end his active life before reaching 70.

His first job in the U. S. was as a riveter, following which he worked for a while with Erie Railroad, then joined the John R. Kleim Mills in Buffalo, bicycle manufacturer. Later Kleim began making parts for Ford and in 1912 was absorbed by Ford, with Knudsen being placed in charge of all 27 Ford assembly plants. During World War I he supervised construction of eagle boats when the Ford Rouge Plant was in its early stages and in his nine years with Henry Ford he never had a title, although he was the recognized top production executive.

William S. Knudsen's particular forte was pressed steel and after leaving Ford he took charge of Ireland & Matthews Mfg. Co., a leader in this field. He gathered about him some of the smartest technicians in the steel stamping business and they never left him even though he moved far on up the ladder, in 1925 taking over the top production post at Chevrolet and quickly leading this manufacturer to first place in the low-price passenger car field. In 1927, Chevrolet built 1,000,000 cars, then quickly retooled for a 6-cylinder engine and pushed annual production up to 1,330,000.

Understood Working Man—In the abortive UAW strikes of 1937, Knudsen played a leading role as negotiator, although many felt later he was too sympathetic throughout the trouble for the best interests of General Motors. Be that as it may, Knudsen knew the working man and his problems intimately and was inclined to brush aside the stuffiness of some top corporation brass. His rise to the presidency of GM was inevitable, even though he never made a public speech until he was 50. Sitting at his polished desk on the 15th floor of the General Motors Building, his hat on most of the time, he would answer the phone with a gruff Danish-accented, "Dis is Knoodsen," and initial most of his letters with a simple "K."

Headed WPB — When war clouds gathered again in 1940, he turned to the service of his country in organizing military production. This was the job that eventually burned out even his giant muscular frame. When he first was summoned to Washington, someone told him he would have the opportunity to make a place for himself in history. He replied, "I don't give a damn about a place in history, but if there is anything I can do for the country now I want to do it." He did it, and his place in American history is assured.

WILLIAM S. KNUDSEN

After he took off his army uniform finally and put on a new dark blue suit with the usual wide pin stripe, he talked to reporters one day at GM building. He was as smiling and affable as ever, but it was plain to see he was not the old Bill Knudsen. The fire was gone from his eye and his greatest wish was simply to enjoy life with his grandchildren on his Grosse Ile country estate. For a time he dabbled in affairs of the Hupp Corp., until illness forced his retirement. At times in a complete coma, and again able to walk about for a short while, he grew worse in the past few weeks—and the book closed. There is a part of Bill Knudsen in every one of the 35 million cars and trucks now rolling over U. S. highways.

Reuther Wounded

Shotgun wounding of Walter P. Reuther, president of the UAW-CIO by an unknown assailant who fired through a kitchen window as the union leader stood eating a late snack with his wife has resulted in the posting of rewards totaling around $116,000 for information leading to the arrest of the attacker and an intensive manhunt by Detroit police. Opinion around Detroit runs to the belief that job was the work of some drunken crackpot, perhaps a former minor union official who had been discharged in Reuther's purge of alleged communists. Wounded in the right arm, the union chief apparently will recover and not lose the use of his arm.

Never prone to let any occasion pass without some levity, Detroit gagsters are now passing around the following cracks — "Well, now that Reuther has been wounded in the right arm, he probably will become a left-winger" and "Whoever did the job showed very poor Marxmanship." It seems certain the attack on Reuther will only enhance his stature among the rank and file of the UAW which, if nothing else, demonstrates the distorted thinking of the screwballs responsible.

Chrysler Is Target

Refusal of Chrysler's offer of a 6-cent hourly increase by UAW negotiators in contract discussions was followed by immediate withdrawal of the offer and by the union's disinterment of the old argument for wage increases based on "ability to pay." And the dispute has been taken from the conference table into the public press through half-page advertisements. By the convenient dodge of

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figuring profits as a percentage of capital investment instead of percentage of sales, it is made to appear that Chrysler earned fantastic profits by sweating them out of workers. Actually, profits last year figured to 4.93 per cent of sales, against an average of 5.48 per cent in the five prewar years.

It appears entirely illogical, although ideal for union propaganda, to cite earnings as a per cent on investment, since the latter is expressed in terms of prewar dollars which were nearly twice the value of present dollars in respect to buying power. It all goes back to the old expression, "figures cannot lie, but liars can figure."

Actually, Chrysler hourly working forces are no worse off than those of any other automobile company. It is simply that Chrysler has been selected as the principal target this time, mainly because General Motors employees took such an economic beating in the 1946 strike. As pointed out last week in public statements by U. S. Steel, average weekly earnings have increased nearly 92 per cent in the past eight years, against a 67 per cent increase in the cost of living. The same figures apply in automobile manufacturing, although the union gets around them by taking 1946 as a starting point and figuring changes from then.

Wages, Prices Studied

There is unanimous sentiment in the automotive industry that all prices are too high, yet in the face of current costs of labor, building construction, machinery and tooling high profits are essential if sufficient reserves are to be accumulated to maintain plant and equipment and to meet the costs of retooling models. It is not unlikely close study is being given to the moves of leading steel companies in refusing further wage increases and at the same time making at least a token downward adjustment of prices. Difficulties of pursuing this policy in automobiles is that the savings involved in lower steel costs, will be more than canceled out by higher freight costs, abandonment of the Detroit arbitrary charge by others, high cost of steel bought on "conversion" basis, etc.

Willys Net High

High costs notwithstanding, Willys-Overland Motors, Toledo, has managed to boost its production to the point where a net profit of nearly $3.2 million was shown for the first six months of its fiscal year, nearly equal the profit earned in the entire 1947 fiscal year and almost three times the profit of the corresponding six months of the previous year. Although the profit figured to the equivalent of $1.06 per common share, it amounted to only 3.5 per cent on gross sales of better than $90 million, covering 72,040 vehicles. Further increases in production are contemplated during the last half of the current fiscal year, and employment rolls will be expanded.

Complete reorganization of supervisory personnel of Willys' wholly-owned subsidiary, Wilson Foundry & Machine Co., Pontiac, Mich., has been effected in the past three months. New vice president and foundry manager is W. G. Hambley, formerly superintendent of research for Allis-Chalmers in Milwaukee and later associated with Studebaker and Kaiser-Frazer. F. C. Miles, former division controller for Kaiser-Frazer has been elected treasurer, and A. H. Shepherd, recently foundry superintendent of Aluminum Alloys Corp., Detroit, is now plant engineer.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,277	366,205
February	399,432	393,636
March	519,112	443,588
April	447,000*	445,137
May		404,191
June		421,466
July		400,944
August		364,478
September		444,501
October		461,536
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

Estimates for week ended:

	1948	1947
April 10	103,004	97,893
April 17	104,761	105,337
April 24	105,242	102,447
May 1	92,000	101,690

Estimates by Ward's Automotive Reports

GM Reports Division News

In its annual financial report a year ago, General Motors asked for suggestions from employees as to what they would like to see incorporated in the review to improve its context. High on the list of suggestions were requests for specific information on what the various GM Divisions were doing. So, this year, the report includes a section, "highlights from the divisions," as well as a map showing location of all plants. GM has 88 plants in 49 cities, along with four Canadian properties and 24 manufacturing and assembly plants overseas, graphically reflecting the diversification the corporation has achieved and suggesting the economic advantages accruing therefrom.

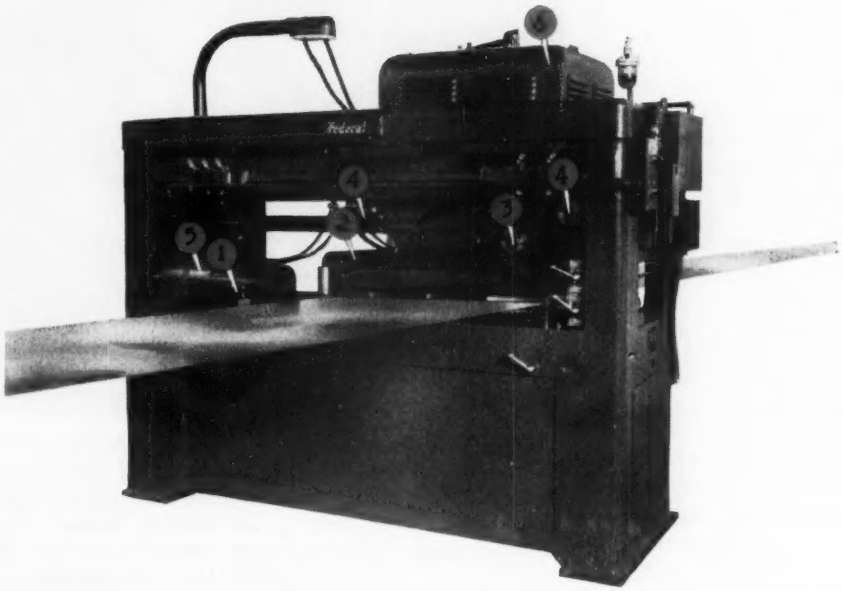
Much of the divisional news is known to those who follow industrial developments. However, some may not be, such as the following extracts—Frigidaire in Dayton, O., has expanded plant facilities by 50 per cent, and has matched this increase in sales volume over 1941—Moraine Products in the same city has developed a new method which doubles the strength of certain parts made from iron powder, and these parts now can be produced with 2½ times the strength of ordinary cast iron. . . . . AC Spark Plug in Flint, Mich., has adopted aluminum oxide insulators for all spark plugs, giving wider heat range, better temperature shock resistance and less fouling. . . . Allison Division in Indianapolis produces more jet engines for aircraft than any other company in the U. S., furnishing jet power units for several multijet bombers and half a dozen different fighter planes. . . . Delco Appliance in Rochester, N. Y., has developed a new impulse-type electric clock for automobiles, and a new oil burner mechanism which swings away from its housing to facilitate servicing. . . . Detroit Diesel celebrated its 10th birthday last year and built marine and industrial engines equivalent to 2,500,000 horsepower, or 2½ times 1941 output. . . . Detroit Transmission was building hydra-matic transmission units at the rate of 1200 daily by last December. . . . Electro-Motive Division celebrated its 25th anniversary in 1947 and during the year built an average of 78 locomotives a month. . . . Saginaw steering gear engineers have perfected a new jack which can be placed under the side of a car frame to lift one entire side of the car in one operation, bringing both wheels off the ground.

Age No Barrier

Studebaker, long known for its father-son teams among employees, has compiled some interesting statistics on average ages of hourly-rated working people. One-third of the 14,728 men and women on the payroll are over 45 years of age, 53 per cent are over 35. Average age of the staff is 38.

Federal

puts the heat on strip production



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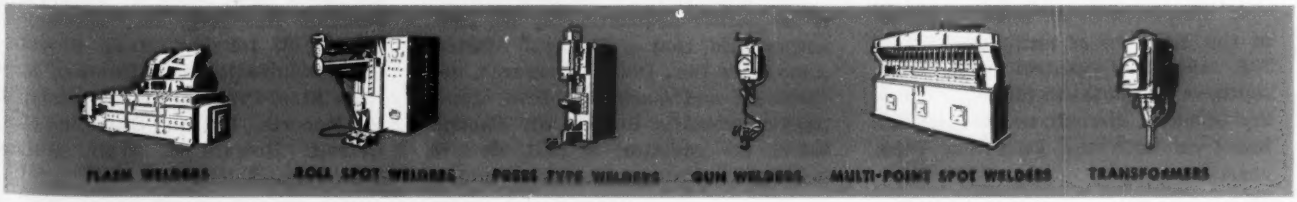

Chance Vought Will Move to Dallas, Texas

CHANCE VOUGHT Aircraft Division of United Aircraft Corp. which is manufacturing the Navy's new jet fighter planes will move its operations permanently from Stratford, Conn., to the former "B" plant of North American Aviation Co., at Grand Prairie, Tex., near Dallas.

Rex B. Beisel, general manager of the division, will be in charge of the movement to Texas which will involve some 1400 families and will be accomplished gradually over the next year to 18 months.

To Manufacture Pirates — Chance Vought will manufacture the XF6U-1 Pirate in the government-owned standby plant whose area of 2,900,000 sq ft is approximately double the size of the company's Stratford factory. The division has subleased plant "B" from Texas Engineering & Mfg. Co. which will continue to occupy plant "A." The lease is from May 1 to the end of this year. The Navy has executed a prime lease with Chance Vought from Jan. 1, 1949, for the entire Dallas facility, with Temco subleasing a portion of "A" from Chance Vought for four years. A provision in the lease provides for two additional five-year options.

Division officials said they would continue work on the F4U-5 Corsair until late this year at their present Connecticut factory where 8000 currently are employed. Eventually the Corsair will be manufactured in Texas, but for the time being only Pirates will be built in the Southwest.

Texas Location Advantageous — Mr. Beisel said Chance Vought is in agreement with the Navy that the Texas facilities offer the following advantages over the Stratford plant:

1. Larger and more efficient manufacturing quarters, capable of considerable expansion in case of emergency.
2. Better flying facilities and flying weather for high-speed jet planes, which will constitute the majority of the division's output in the future.
3. Lower maintenance costs.
4. Dispersal to an inland position in the interests of national defense.
5. Improved, central location on southern air routes to facilitate delivery of naval aircraft to the fleet air bases on both the East and West coasts.

STUDY INDUSTRY: Among high-ranking Air Force, Army and Navy officers who are investigating methods and skills needed to mobilize the national economy in an emergency are Navy Capt. George J. Dufek, Chevy Chase, Md., and Lt. Col. John H. Weber, Philadelphia, watching Inspector Anna Duffy size-gage one-inch precision bearing balls at SKF Industries Inc., Philadelphia

Chance Vought is one of four divisions of United Aircraft Corp. whose head offices are in East Hartford, Conn.

Morton-Gregory Buys Nelson Stud Welding

Morton-Gregory Corp., recently formed organization with headquarters in the Manhattan Bldg., Toledo, O., has purchased the manufacturing assets and patent interests of Nelson Stud Welding Corp., Lorain, O.

The Nelson firm was formed by Ted Nelson, an inventor who developed the stud welding process during the war for use in ship construction. Since the war peacetime uses for the process have been found in the railroad car, appliance, automotive and construction industries. The company will be known as the Nelson Stud Welding Division of Morton-Gregory with manufacturing and engineering activities centralized in Lorain.

This purchase follows on the heels of an earlier acquisition by the new corporation, that of Henry J. Morton Associates Inc., Detroit, research, develoment and marketing firm. Company's products include an electric warm air radiator, a cast electric heating element in the development stage and other items. The Morton research laboratories will continue operations in Detroit as a division of Morton-Gregory.

Officers of the Toledo organization include Henry J. Morton, president, and George E. Gregory, vice president and general manager. Mr. Morton is a consulting electrical engineer, associated in the past with several companies, including Owens - Corning Fiberglas Corp. Mr. Gregory recently resigned as vice president of Owens-Corning Fiberglas.

Pressed Metal Institute Elects Officers, Directors

The following officers of the Pressed Metal Institute, Cleveland, have been elected for the ensuing year: Tom J. Smith Jr., president; Walter A. Gorrell, E. J. McAlear & Co., Philadelphia, executive vice president; J. J. Boehm, Boehm Pressed Steel Co., Cleveland, secretary-treasurer.

Members of the executive committee are: F. C. Greenhill, Acklin Stamping Co., Toledo, O.; W. G. Jeschke, Res Mfg. Co., Milwaukee; Harvey S. Johnson, Metal Specialty Co., Cincinnati; Sam Morrison, Morrison Steel Products Inc., Buffalo; G. H. Roberts, Detroit Stamping Co., Detroit; Howard E. Wolf, Mullins Mfg. Corp., Salem, O.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Diesel Engine Division, General Motors Corp., Detroit, has purchased from the U. S. Navy a plant it operated during the war at Clinton Rd. and W. 73rd St., Cleveland. Facility will be used for the manufacture of engines and parts.

—o—

Magnus Brass Division, National Lead Co., New York, has acquired Coale Muffler & Safety Valve Co., Baltimore, manufacturer of safety valves for locomotives and other products, and is operating the company's plant.

—o—

Lake Carriers' Association, Cleveland, has just published its Annual Report which contains statistics regarding Great Lakes shipping in 1947.

—o—

National Supply Co., Pittsburgh, producer of oil country goods, has opened new quarters at 3501 Chester Ave., Bakersfield, Calif.

—o—

G. S. Rogers & Co., Chicago, producer of oils and chemicals for metal processing, has appointed Lubrication Inc., Rochester, N. Y., as its distributor in central and western New York.

—o—

Allen - Bradley Co., Milwaukee, manufacturer of electric motor controls, has moved its Chicago office to 445-447 N. LaSalle St. John McC. Price is district manager.

—o—

Vacuum Cleaner Manufacturers' Association, Cleveland, announces that factory sales of standard-size household vacuum cleaners in March totaled 355,200 units, third highest productive month in the industry's history. Higher months were October and December of last year.

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Bendix Home Appliances Inc., South Bend, Ind., has reduced prices on its new model automatic washers by 7 per cent at the retail level.

—o—

Industria Electricade Mexico S. A., Mexico City, Mexico, has begun initial production of electrical appliances and industrial and central station apparatus. The Mexican firm has a 20-year license agreement with Westinghouse Electric Corp., Pittsburgh, providing for all technical phases of plant layout, operation and product design.

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Texas Bolt & Supply Co., Houston, Tex., wholesaler of bolts and nuts, has purchased two warehouses in Houston for $75,000.

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United States Rubber Co., New York, announces that productivity in its tire division has increased 13 per cent to 20.9 pounds of rubber processed per man-hour in 1947 from the low of 18.5 pounds per man-hour immediately following the war. The 1947 productivity, however, is still lower than it was before the war.

—o—

War Assets Administration reports that about $45 million in industrial plants and equipment in the Southwest are affected by President Truman's recent freeze order. Largest facility involved is the $13 million Torrance, Calif., plant operated during the war by Aluminum Co. of America.

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Western Society of Engineers has moved to 84 E. Randolph St., Chicago. The society has spent approximately $100,000 in renovating and equipping its new headquarters.

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Manco Products Co., newly organized firm which has developed methods for use of beryllium copper in production of cavities and cores for plastic molds, has purchased a plant at 2401-09 Schaefer Rd., Melvindale, Mich. M. A. Nichols is president of the organization.

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University of California Press, Berkeley, Calif., is publishing *Favored Industries in Los Angeles* by Philip Neff and others. The pamphlet is an analysis of production costs in the Los Angeles area and is a condensation of a larger work first sponsored by the Haynes Foundation, Los Angeles.

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Johnson Steel & Wire Co., Worcester, Mass., producer of wire, has opened an enlarged laboratory at its Worcester plant.

—o—

Martin-Quaid Co., fabricator of alloy metals, will be located in new and larger quarters at 1815 W. Sedgley Ave., Philadelphia, on or about June 1.

—o—

Reynolds Metals Co., Richmond, Va., reports that its Reynolds Internacional de Mexico S.A. has opened an aluminum foil plant at Tlalnepantla, a suburb of Mexico City, Mexico. While only aluminum foil is being produced at this time, the rolling of aluminum sheet and the fabrication of aluminum shapes is planned for the future.

—o—

Midwest Tool & Mfg. Co., producer of metal cutting tools and other products, has moved from Detroit to Upper Sandusky, O. Branch offices are being retained in Detroit at 2360 W. Jefferson Ave., and in Chicago at 549 W. Washington Blvd.

—o—

Gerity-Michigan Corp., Detroit, manufacturer of die cast and plated parts for the automotive and other industries, has signed an agreement with Crosby Research Foundation, Hollywood, Calif., giving Gerity-Michigan the right to manufacture and market any of the inventions of the foundation, which is headed by Larry Crosby, brother of Bing Crosby. Another agreement is with Harley Earl Corp., Detroit, which calls for products styling, design and marketing consultation and research on Gerity-Michigan products.

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Thor Corp., Chicago, producer of electrical appliances, has purchased land adjoining its main plant and offices at Chicago to expand facilities.

—o—

Independent Pneumatic Tool Co., manufacturer of portable power tools, has moved from Chicago to Aurora, Ill. A Chicago office for sales and service will be maintained at 600 W. Jackson Blvd., pending construction of a new branch office building.

—o—

New York State Department of Commerce has urged 23 iron and steel firms with extensive mining interests to investigate what may be extensive new iron ore deposits in Franklin county in the Adirondacks.

—o—

Hanover Steel Corp., New York, subsidiary of Solar Steel Corp., will build a new steel warehouse in Union Township, N. J., to be completed by early fall. The facility, containing 30,000 sq ft of floor area, will carry flat-rolled products and will maintain equipment for shearing, slitting, flattening and edge rolling.

—o—

National Bureau of Standards, Department of Commerce, reports that printed copies of the latest revision of the Commercial Standard for Porcelain-Enameled Steel Utensils (CS100-47) are now available and may be purchased from the Superintendent of Documents, Government Printing Office, Washington, for ten cents each.

The Business Trend

PROGRESS in the uphill climb by industrial production to its pre-coal strike level was made in the week ended Apr. 24 with STEEL's index rising three points to 153 per cent (preliminary) of the 1936-1939 weekly average. Total recovery will be delayed, however, until coal stocks are substantially replenished and depleted inventories are again brought into balance.

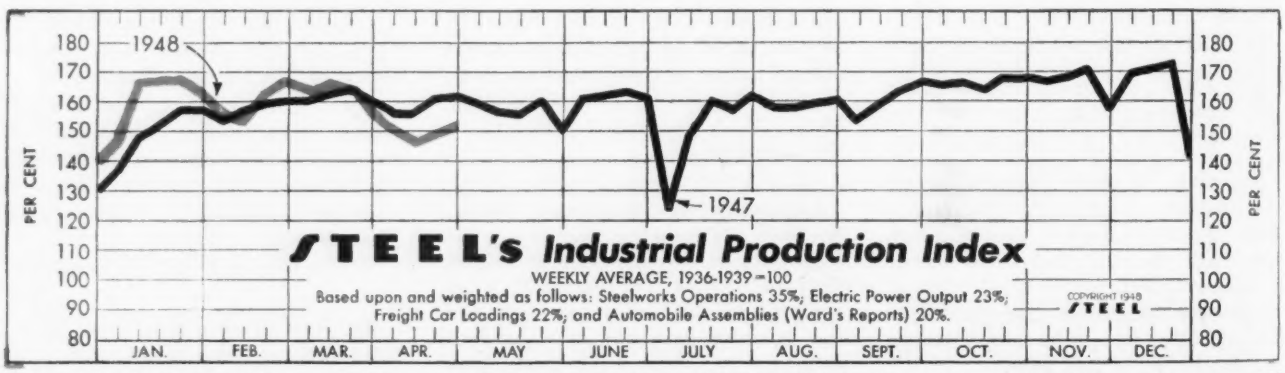
OUTPUT—Effect of the coal strike was reflected only slightly in Federal Reserve Board's seasonally adjusted production index for March. The index was two points lower at 192 per cent of the 1935-1939 average. Durable goods manufacturing rose four points to 230 per cent, mainly because of larger output of steel and automobiles. Production of machinery and most other durable goods was maintained at previous months' levels. Output of minerals was down 10 per cent as the result of the bituminous miners' walkout in mid-month.

STEEL—National ingot rate moved 2.5 points upward to 75.5 per cent in the week ended Apr. 24, but prices stole the spotlight when U. S. Steel made known its intention to cut prices on a variety of steel products, mainly those used in consumers goods. The reductions, totaling about $25 million on last year's sales of the affected products, were made in an anti-inflation move and came as an answer to union demands for substantial wage increases.

PRICES—Wholesale prices increased sharply in the week ended Apr. 17 as higher quotations for farm products and foods pushed the Bureau of Labor Statistics index to 162.9 per cent of the 1926 average, within 0.5 per cent of the January level. Industrial raw materials were up 2.2 per cent in the latest week to 178 and manufactured products gained 1.2 per cent to 157.8. From mid-February to mid-March a drop of 1.2 per cent in food prices more than offset fractional increases in other living expenses to bring about a 0.4 per cent reduction in the retail prices of goods and services purchased by moderate-income families in large cities. BLS' consumers' price index eased to 166.9 per cent of the 1935-1939 average, 6.8 per cent higher than a year ago and 69.3 per cent above the August, 1939, level.

COAL—Mining operations were back to normal last week despite still-pending issues in the dispute. First appreciable increase in coal mining activity came in the week ended Apr. 17, soft coal production rising 5,280,000 tons over the previous week to reach 7,715,000 net tons and Pennsylvania anthracite output gaining 24 per cent to 1,054,000 net tons.

CONSTRUCTION—Dollar volume of construction contracts let in the first quarter of 1948 in 37 eastern states set a new high for that period at $1,986,936,000, according to F. W. Dodge Corp. This volume is 23 per cent greater than the previous peak for the like period, occurring last year. Residential contracts were about the same as in 1947, but nonresidential contracts were up 42 per cent and heavy engineering awards increased 46 per cent.



Index (chart above): Week ended Apr. 24 (preliminary) 153 Previous Week 150 Month Ago 158 Year Ago 162

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	75.5	73.0	93.0	95.5
Electric Power Distributed (million kilowatt hours)	5,027	5,087	5,065	4,668
Bituminous Coal Production (daily av.—1000 tons)	1,285	388	727	2,138
Petroleum Production (daily av.—1000 bbl.)	5,415	5,391	5,377	4,930
Construction Volume (ENR—Unit $1,000,000)	$136.7	$144.6	$137.9	$88.4
Automobile and Truck Output (Ward's—number units)	105,242	104,761	107,284	102,447

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

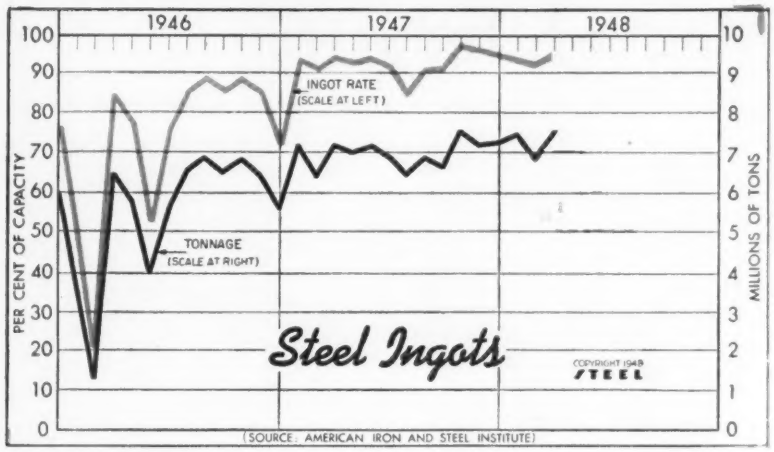
TRADE				
Freight Carloadings (unit—1000 cars)	850†	786	664	894
Business Failures (Dun & Bradstreet, number)	100	101	101	66
Money in Circulation (in millions of dollars)‡	$27,718	$27,774	$27,851	$28,105
Department Store Sales (change from like wk. a yr. ago)‡	+8%	+13%	+9%	−6%

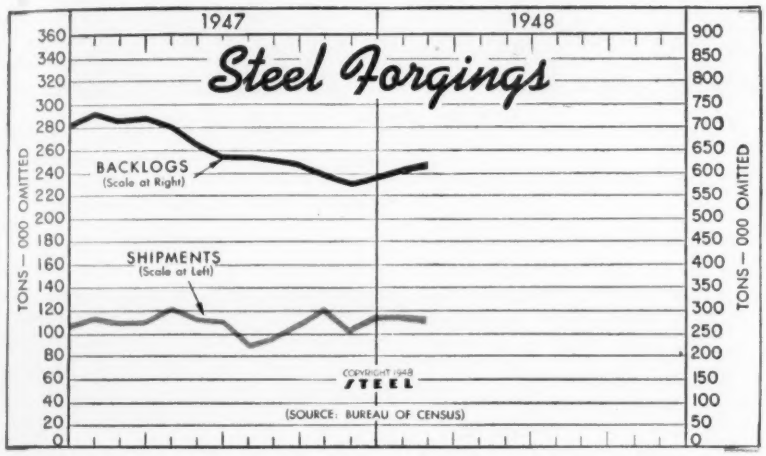
† Preliminary. ‡ Federal Reserve Board.

Steel Ingots

	Production (Net Tons—000)			Operating Rate (% of Capacity)		
	1948	1947	1946	1948	1947	1946
Jan.	7,473	7,213	3,873	93.6	93.0	49.6
Feb.	*6,940	6,422	1,393	93.0	91.7	19.8
Mar.	7,613	7,307	6,509	95.3	94.3	83.3
Apr.	....	7,043	5,861	...	93.8	77.5
May	....	7,329	4,073	...	94.5	52.2
June	....	6,969	5,626	...	92.8	74.4
July	....	6,570	6,619	...	84.9	84.9
Aug.	....	6,982	6,924	...	90.1	88.7
Sept.	....	6,789	6,556	...	90.6	86.9
Oct.	....	7,560	6,952	...	97.5	89.0
Nov.	....	7,233	6,458	...	96.3	85.4
Dec.	....	7,366	5,760	...	95.2	73.9
Total		84,784	66,603	Ave.	92.9	72.5

* Revised.





Steel Forgings

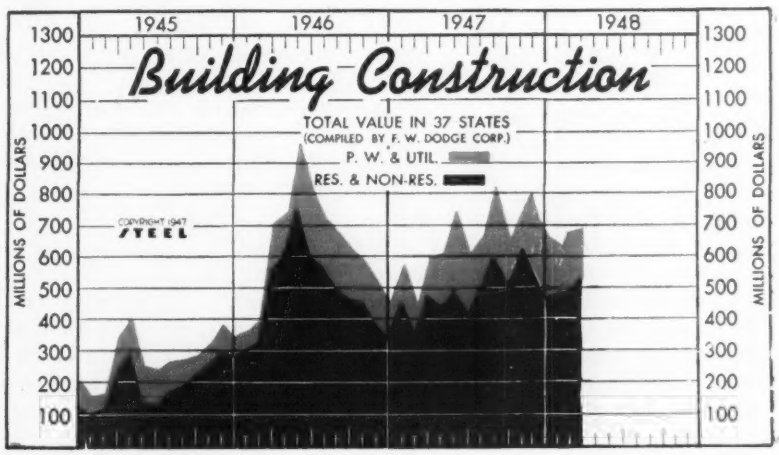
Tons—000 omitted

	Shipments*		Unfilled Orders*	
	1948	1947	1948	1947
January	118	116	618	723
February	117	111	630	714
March	...	115	...	717
April	...	121	...	699
May	...	115	...	663
June	...	110	...	638
July	...	92	...	631
August	...	98	...	626
September	...	109	...	617
October	...	124	...	594
November	...	104	...	586
December	...	117	...	594

* Forgings for sale.

Construction Valuation in 37 States (Unit—$1,000,000)

	Total	Public Works Utilities		Residential and Non-residential	
	1948	1948	1947	1948	1947
Jan.	615.2	136.6	113.9	478.6	457.7
Feb.	682.0	177.3	90.5	504.6	351.6
Mar.	689.8	164.3	122.0	525.5	474.8
Apr.	....	....	161.4	....	441.0
May	....	....	252.9	....	490.0
June	....	....	185.7	....	419.4
July	....	....	165.9	....	494.4
Aug.	....	....	223.5	....	599.7
Sept.	....	....	141.5	....	508.4
Oct.	....	....	165.9	....	627.4
Nov.	....	....	181.5	....	533.6
Dec.	....	....	154.1	....	471.3
Totals	....	....	1,958.8	....	5,869.3



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,226	$12,663	$14,155	$12,522
Federal Gross Debt (billions)	$252.3	$252.3	$253.1	$257.9
Bond Volume, NYSE (millions)	$33.8	$23.4	$20.4	$18.0
Stocks Sales, NYSE (thousands)	10,545	7,378	5,706	4,380
Loans and Investments (billions)†	$62.8	$62.9	$63.8	$63.5
United States Gov't. Obligations Held (millions)†	$35,260	$35,214	$36,061	$39,556

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$81.14	$81.14	$81.14	$69.82
All Commodities†	162.9	160.6	161.5	147.2
Industrial Raw Materials†	178.0	174.1	176.5	160.3
Manufactured Products†	157.8	156.0	156.3	142.1

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

GEN. DONALD ARMSTRONG

CHARLES H. HALFORD

NEIL F. RITCHEY

Charles R. Hook has been elected chairman of the board of Armco Steel Corp., formerly known as American Rolling Mill Co., Middletown, O. **W. W. Sebald,** executive vice president, has been elected president, to succeed Mr. Hook, who has been president since 1930, and who will continue as chief executive officer. Mr. Sebald joined the corporation in 1906. He was elected vice president in charge of commercial activities in 1926, and became executive vice president in 1947.

—o—

Gen. Donald Armstrong, executive vice president, has been elected president of United States Pipe & Foundry Co., East Burlington, N. J., succeeding **N. F. S. Russell,** elected chairman of the board, and who has served as president for 25 years. Prior to joining the company in 1947, Gen. Armstrong was assistant chairman of the executive committee of the American Standards Association. He served in the U. S. Army for 37 years, and during World War II served as chief of the Chicago Ordnance District, and later as commandant, Industrial College of the Armed Forces.

—o—

Midvale Co., Philadelphia, announces election of **Francis Bradley,** chairman of the board; **Richard T. Nalle,** president; **Henry H. Ziesing,** vice president in charge of sales; **Charles E. Acker,** secretary; **Thomas A. Sappington,** treasurer and assistant secretary; and **William A. Delafield,** assistant treasurer. The following were elected to the executive committee: **Charles E. Brinley,** chairman, **James E. Gowen, Edward Hopkinson Jr.,** and **Ralph Kelley,** with Francis Bradley, chairman of the board, and Richard T. Nalle, president, members ex officio.

—o—

Harbison-Walker Refractories Co., Pittsburgh, has appointed **Charles H. Halford** as export sales manager, with headquarters in New York. Associated with the company since 1933, Mr. Halford served in the sales departments of both the Cleveland and Buffalo, N. Y., offices. He has acted as assistant export sales manager since 1947, when he transferred to the New York office. **C. Howard Nold,** Philadelphia district sales manager, has retired after a service of 45 years. He is succeeded by **H. S. Schweinsberg,** who assisted him in that district.

—o—

Cummins Engine Co. Inc., Columbus, Ind., has named three new vice presidents and one new director for the ensuing year. The newly elected vice presidents are: **L. W. Beck,** vice president-sales; **D. J. Cummins,** vice president-engineering; and **W. M. Harrison,** vice president and treasurer. **Carl R. Fox,** who has been vice president and works manager for several years, is the newly elected director. **W. J. Manning** has been elected assistant secretary and assistant treasurer, and promoted to the position of controller from his former position of assistant controller.

—o—

E. W. Wilhelmy, secretary-treasurer of American Welding & Mfg. Co., Warren, O., has been elected to the newly created position of vice president of finance. **E. C. Fales,** former vice president-operations, has been made executive vice president; and **Henry H. Alden,** former assistant secretary-treasurer, has been named treasurer and assistant secretary.

—o—

Neil F. Ritchey has been named an engineer in the technical service department of Reynolds Metals Co., Louisville. For the past few years he has been with General Electric Co. in Fort Wayne, Ind., as a metallurgical engineer in charge of nonferrous metallurgy in the works laboratory.

—o—

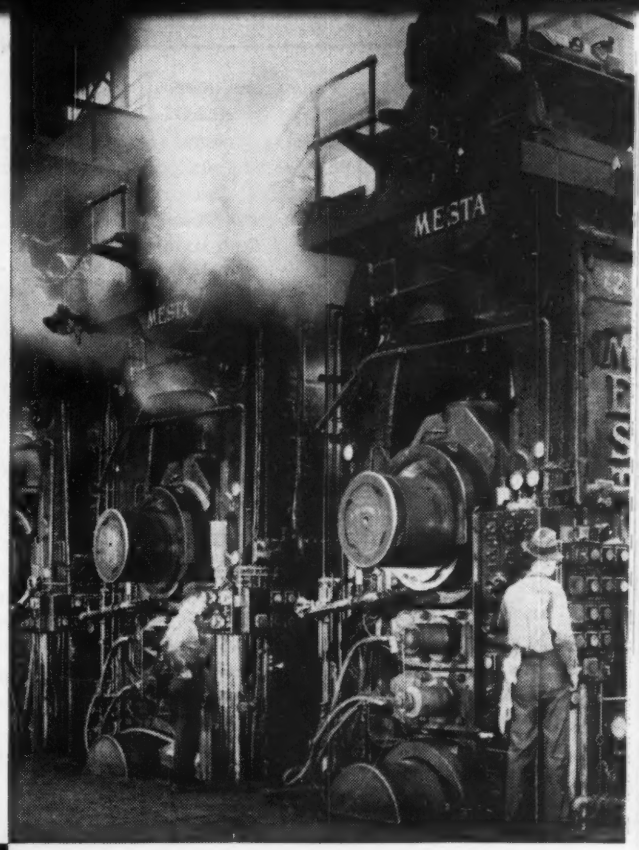
John F. D. Rohrbach has been elected president of Raybestos-Manhattan Inc., Passaic, N. J., succeeding **Sumner Simpson,** who has been president since the formation of the company in 1929, and who becomes chairman of the board and of the finance committee. Mr. Rohrbach, who joined the corporation in 1939, has served in the positions of assistant to the president, executive vice president and treasurer. Other officers elected are: **W. H. Dunn,** former comptroller, named treasurer, and **W. W. Kievit,** formerly secretary, elected comptroller and secretary. Two new members added to the board of directors are: **W. S. Simpson,** director of personnel, Raybestos Division, and **George W. Marshall Jr.,** general manager, Asbestos Products Division.

—o—

Henry J. Morton has been named president of the recently-formed Morton-Gregory Corp. of Detroit and Toledo, O. **George E. Gregory** is vice president and general manager. **Horace S. Maynard,** associated with Fred J. Fisher Estate, is secretary and treasurer of Morton-Gregory Corp. Serving with Messrs. Morton, Gregory and Maynard on the firm's board of directors are: **Martin G.**

SUNVIS "900" OILS . . for the toughest lubrication jobs

Sunvis "900" oils are in use today in turbines, circulating systems, hydraulic systems, textile machinery and in many other types of application.



Two years ago, we introduced our Sunvis 900 Oils, Sun's premium grade for industrial use. Since then, Sunvis 900 Oils have been proving their ability to resist oxidation and sludging under the most rigorous operating conditions. They stand up for long periods of continued use at extremely high temperatures without appreciable change in physical characteristics, body, color or "neut number." Sunvis 900 Oils possess a high viscosity index and in addition have the unusually low pour-point of 0°F.

Wherever continued operations, high speeds, heavy loads and extremes of temperature combine to threaten your equipment investment . . . wherever lubrication problems are really *tough*—rely on Sunvis 900 Oils. There are distinct grades specially created to meet the requirements of each kind of application. All are fortified against the formation of harmful oxidation products, sludge and rust.

Sunvis 900 Oils assure you of economies through longer equipment life, continuous operations for longer periods between oil changes, less frequent "down time" for inspection and repairs.

For details write to the Industrial Advertising Department for Sunvis 900 booklet.

SUNOCO

SUN OIL COMPANY

Philadelphia 3, Pa.

In Canada: Sun Oil Company, Ltd., Toronto and Montreal

Chapin Sr., vice president and director, Metal Specialty Co., Cincinnati; **Raymond T. Perring,** vice president, Detroit Bank; **Edwin C. Lewis,** senior partner of Lewis & Watkins, Detroit legal counsel; **William J. Kane,** formerly sales manager of Industrial Division, Owens-Corning Fiberglas Corp., and who will also act in the capacity of sales manager of consumer products for Morton-Gregory Corp.; **Dr. Vernon C. Abbott,** Pontiac, Mich.; and **William Sinclaire,** an officer of Corning Glass Works. Mr. Morton, consulting engineer and one of the editors of *National Electric Code*, has served as consultant to the Association of Edison Illuminating Cos., the Edison Electric Institute, the Owens-Corning Fiberglas Corp., and the John B. Pierce Foundation of New York. Mr. Gregory resigned as vice president of Owens-Corning Fiberglas Corp. several months ago to accept the general managership of the new firm.

—o—

Expansion of engineering activities of Electro-Motive Division, General Motors Corp., at LaGrange, Ill., includes creation of a new separate engineering activity headed by **R. M. Dilworth,** chief engineer since 1926, who has been appointed engineering assistant to vice president. **E. W. Kettering**, former assistant chief engineer, is appointed chief engineer. **L. F. Campbell,** former chief production engineer, is appointed executive engineer.

—o—

Clarence E. Unterberg, New York, has been elected to the board of directors, Pacific Airmotive Corp., Burbank, Calif.

—o—

Robert Blair has been appointed assistant to the president, Clyde Porcelain Steel Corp., Clyde, O.

—o—

John B. Morrow Jr. has been appointed personnel manager for the Southern Wheel Division of American Brake Shoe Co., New York. Formerly superintendent of the division's plant in Portsmouth, Va., Mr. Morrow has been with the Brake Shoe Co. for 28 years.

—o—

Ralph J. Hinkle has been elected vice president of Garlock Packing Co., Palmyra, N. Y.

—o—

James Y. Scott, president of Van Norman Co., Springfield, Mass., and president of the Morse Twist Drill Co., New Bedford, Mass., has been named special emissary by the American Society of Tool Engineers to the Institution of Production Engineers in England. **H. F. Owen,** professor of industrial engineering in the department of general engineering at Purdue University, has been named chairman of the National Education Committee of the American Society of Tool Engineers.

—o—

H. Hartmann has been appointed general manager of Fresh'nd-Aire Co., Chicago, a division of Cory Corp., and manufacturer of air circulators and room humidifiers. He has been with the company since 1944. **J. W. Wallace** has been named general sales manager, and **Lewis Seil,** chief production engineer of the company. Mr. Wallace succeeds the late **D. B. Huggard. Arnold Leavitt** has been appointed purchasing agent of the company. Two new sales representatives added to its sales organization are **B. T. Rupp,** appointed southern representative to cover southern California, and **John Steele,** to cover the Memphis and Little Rock area.

—o—

Ronald F. Marsden has been appointed director of purchases for L. J. Mueller Furnace Co., Milwaukee. **E. R. Stemper,** director for many years, will remain with the company in a consulting capacity.

—o—

Harry L. Gebauer has been appointed by Hamilton Steel Co., Cleveland, to take charge of this firm's new aluminum department. The Hamilton Steel Co., warehouse specializing in cold finished bars and tubing, recently became one of the two Ohio distributors for aluminum sheets and bars produced by Reynolds Metals Co. Mr. Gebauer was recently Cleveland representative for Permanente Products Co., Permanente, Calif.

—o—

G. S. Rogers & Co., Chicago processing materials firm, has appointed **Ambrose McNamara** as eastern New York and New England area representative of the company's specifications products used in the heat treatment and finishing of metals.

—o—

Walter A. Heimsch, Dayton Appliance Co., has been elected a director of the National Screw Machine Products Association.

—o—

D. O. Winton has been appointed regional sales manager for low-temperature welding and brazing alloys and fluxes in Michigan and Ohio for All-State Welding Alloys Co. Inc., White Plains, N. Y.

—o—

William W. Evans has been appointed general sales manager of Power-Pak Products Inc., Buffalo.

—o—

L. H. Littlefield has been appointed general sales manager for Wolverine Tube Division of Calumet & Hecla Consolidated Copper Co. Inc., Detroit, formerly affiliated with Holtzer-Cabot Division of First Industrial Corp., Mr. Littlefield will now have headquarters in the general offices of Wolverine Tube Division in Detroit.

—o—

Geo. D. Roper Corp., Rockford, Ill., announces the appointment of **Frederick R. Dickerson** as sales manager of the Pump Division. He has been with the company since 1936, and as sales engineer was in charge of interpreting pumping problems. In his new position Mr. Dickerson will be concerned chiefly with sales control and market analysis.

—o—

Charles B. Miller has been appointed district sales manager of Goodyear Tire & Rubber Co.'s Mechanical Goods Division at Chicago. He succeeds **Guy E. McMahon,** who will remain in Chicago as special representative for Goodyear industrial

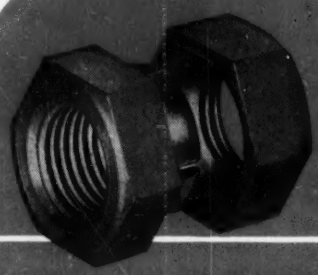
HARRY L. GEBAUER

FREDERICK R. DICKERSON

Self-locking LOCK NUTS

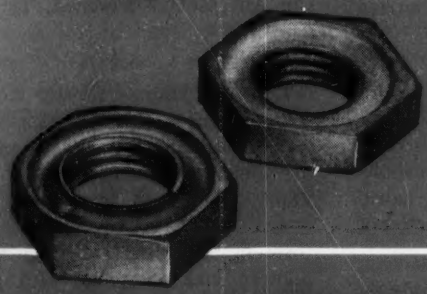
that WON'T shake loose

THESE 4 TYPES FIT EVERY FASTENING PROBLEM



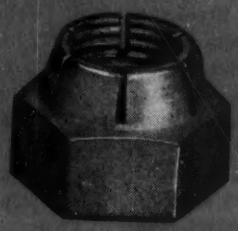
NATIONAL "DRAKE" LOCK NUTS

To withstand severe Stress, Shock or Vibration. Two-piece, positive lock, for use on rugged, heavy equipment, or where thickness and weight are not a factor.



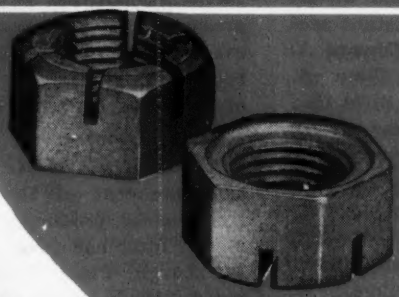
NATIONAL "DYNAMIC" LOCK NUTS

To withstand Shear only. For applications requiring a thin, one-piece, light weight locking nut, and where strains would be in shear only.



NATIONAL "HUGLOCK" NUTS

To withstand Shock-loading or Vibration—even under heat, oil or moisture. One-piece, easily installed, grips the bolt threads and maintains locking effect whether seated or not. Preset torque values, built in, insure vibration-proof results.



NATIONAL "MARSDEN" LOCK NUTS

For effective locking at Minimum Cost. One-piece, cantilever action type. Easily applied, free running until seated. Can be re-used with same locking efficiency.

National
PRODUCTS

Production executives and design engineers:

To help you select the right Lock Nut for your assembly, write today for this useful Lock Nut Booklet which gives you complete data on the engineering, design, weight and cost of these 4 "National" Lock Nuts.

THE NATIONAL SCREW & MFG. COMPANY, CLEVELAND 4, OHIO

rubber products. Mr. Miller is succeeded in Akron as field representative for the Mechanical Goods Division by **William F. Burdick. Charles A. Oostdyk Jr.** has been appointed tank lining field engineer for the west coast district of the division, with headquarters at Los Angeles.

—o—

Stuart N. Smith has been appointed to the new position of general superintendent in charge of all manufacturing operations of Twin Coach Co.'s Buffalo Division, and **Earl H. Lenz** has been named director of engineering. Twin Coach also announces that all of its engineering activities will be centralized in the Buffalo plant.

—o—

Vernon Woodside has been appointed in charge of the New Orleans, sales district, and **Roland F. Boehm,** of the Houston, Tex., sales district of Mathieson Chemical Corp., New York.

—o—

Robert L. Ledbetter has been appointed sales representative for Buckeye Tools Corp. in Texas and Oklahoma. He will handle sales for all Buckeye pneumatic and electric portable power tools, and will introduce the new Stream-Power pneumatic tool line to industrial firms and foundries in his territory.

—o—

Liquid Conditioning Corp., Linden, N. J., announces the appointment of **Robert A. Cooper** as field engineering and sales representative in northern New Jersey.

—o—

Carl F. Jensen has been appointed district sales manager of the midwestern area for Shakeproof Inc., Chicago.

—o—

Harry J. Woolfson has been appointed New England representative for the housewares line of Norris Stamping & Mfg. Co., Los Angeles.

—o—

Saunders P. Jones has joined Mid-West Abrasive Co. of Detroit and Owosso, Mich., as vice president. He formerly had been president of Jones-Dabney Co., Louisville, and the American Central Co., Connersville, Ind. His association with Mid-West will entail sales and advisory work. **Phil Huber,** president of Ex-Cell-O Corp., has been named to fill a vacancy on the board of directors of Mid-West Abrasive Co.

—o—

Directors elected by National Steel Corp., Pittsburgh, are: **E. T. Weir,** chairman, **Frank W. Blair, Leon Falk Jr., George R. Fink, George M. Humphrey, R. L. Ireland, Thomas E. Millsop, Edmund W. Mudge, Earl F. Reed, Murray W. Sales** and **J. H. Thompson.**

—o—

C. H. Longfield, general manager of sales, has been elected vice president and general manager of sales, Youngstown Sheet & Tube Co., Youngstown.

—o—

Paul Grammer, president, Grammer, Dempsey & Hudson Inc., Newark, N. J., has been elected president of the New York Chapter of American Steel Warehouse Association. **James Mead,** district manager, Joseph T. Ryerson & Son Inc., has been elected first vice president; **Rodney Burton,** district manager, Jones & Laughlin Steel Service Inc., Long Island City, N. Y., second vice president; and **James Bragg,** vice president, Eggleston Bros., Long Island City, treasurer; and **Charles Kramer,** secretary.

—o—

Taylor D. MacLafferty has been appointed manager of marketing of Trumbull Electric Mfg. Co., Plainville, Conn. He will have over-all responsibility for field sales, product sales, marketing services and advertising divisions of the company.

—o—

Three officers of Lukens Steel Co., Coatesville, Pa.; two officers of Worth Steel Co., Claymont, Del.; and two officers of Warren Pipe & Foundry Corp., New York, have been elected to the board of directors of E. & G. Brooke Iron Co., Birdsboro, Pa. New directors named were **Robert W. Wolcott,** president; **Charles Lukens Huston Jr.,** vice president; and **J. W. Herman,** treasurer and assistant secretary, Lukens Steel Co.; **Edward A. Worth,** chairman, and **William A. Worth,** treasurer of Worth Steel Co.; **L. R. Dohm,** president, and **E. C. Hopler,** treasurer, of Warren Pipe & Foundry Corp.

—o—

Sherman T. Brown has been appointed assistant foreign sales manager of Le Roi Co., Milwaukee.

—o—

Edwin S. Bundy has been made vice president and chief engineer of Niagara Hudson Power Corp., Niagara Falls, N. Y.

—o—

Robert E. Zarbock has been appointed assistant plant manager at Birmingham for Rheem Mfg. Co.

—o—

Square D Co., Detroit, announces appointment of **J. L. Stanford** as head of the Square D Switch & Panel Division, advertising section. He succeeds **G. La Piner,** who has joined the Evans Products Co., Detroit. Mr. Stanford was formerly manager of advertising and sales promotion for the Automotive Division, Thomas A. Edison Inc.

LOUIS M. HAGUE

—o—

Louis M. Hague, former vice president, Hanson-Van Winkle-Munning Co., Matawan, N. J., has been elected president to succeed **Van Winkle Todd,** appointed chairman of the board of directors. **Guerin Todd,** former vice president, has been appointed vice chairman of the board, and **John A. Bauer,** former sales manager, has been appointed a vice president, assuming many of the duties for which Mr. Hague was previously responsible.

—o—

Wilputte Coke Oven Division, Allied Chemical & Dye Corp., New York, announces appointment of **David M. Griffith** as executive vice president. He has been in the coke oven industry since 1909, and has been associated with the Wilputte organization since its inception.

—o—

Appointment of **A. E. Cutler** as superintendent of the Pittco storefront metal producing plant at Kokomo, Ind., has been announced by Pittsburgh Plate Glass Co., Pittsburgh. He has been serving as assistant superintendent at the Kokomo plant since last May.

—o—

E. L. Klingler has been appointed assistant wire rope sales manager for Colorado Fuel & Iron Corp., New York. In his new capacity he will continue supervision of expanded sales engineering force, in addition to acting as assistant to **A. S. Rairden,** wire rope sales manager of the corporation at Palmer, Mass.

—o—

Edgar W. Trecker has resigned as executive vice president of Kearney & Trecker Corp., Milwaukee, but will

JOSEPH H. HUMBLE

Appointed general sales and advertising manager, Kester Solder Co. of Chicago. Noted in STEEL, Apr. 19 issue, p. 66

W. S. AUSTIN

Elected vice president, LeMaire Tool & Mfg. Co., Dearborn, Mich. Noted in STEEL, Apr. 26 issue, p. 92

H. STURGIS POTTER

Named sales manager in charge of Reading products, Carpenter Steel Co., Reading Pa. Noted in STEEL, Apr. 26 issue, p. 94

continue in an advisory capacity to the board of directors. **Carl F. Enroth** has been appointed works manager of the corporation.

—o—

Roy F. Cratty, recently associated with Greenlee Bros. & Co., Rockford, Ill., has joined the Industrial Advertising Division of Cramer-Krasselt Co., Milwaukee. While at Greenlee Bros. & Co. he was recently in charge of machine tool advertising, and earlier took part in handling woodworking machinery and Tool Division advertising. During his 18 years in Rockford, Mr. Cratty had also been associated in advertising and sales promotion work with Geo. D. Roper Corp., Pump Division, Burd Piston Ring Co., and prior to that was branch advertising man for the International Harvester Co. of Milwaukee.

—o—

Charles R. D'Olive has been appointed vice president and general manager of the newly created Ingersoll Utility Unit Division of Borg-Warner Corp., Chicago. He was for many years manager of the Appliance Division of Stewart-Warner Corp., Chicago, simultaneously serving as vice president and officers' committee member of the board of governors of National Electrical Manufacturers' Association. During World War II he was president of Frederick Hart & Co., producer of aircraft engine components and radar controls, Poughkeepsie, N. Y.

—o—

R. H. Meyers has retired from his position of head of the Steelmaking Division, British Iron and Steel Research Association, because of ill health. He is succeeded by **A. H. Leckie,** formerly deputy head of the division. Both Mr. Meyers and Dr. Leckie served with the technical department of the British Iron and Steel Federation under the Iron and Steel Industrial Research Council prior to British Iron and Steel Research Association's formation in 1945.

—o—

National Tube Co., subsidiary of U. S. Steel Corp., announces the appointment of **L. V. Johnson** as assistant chief engineer, with headquarters in Pittsburgh. He recently was chief project engineer in charge of this subsidiary's modernization and improvement program at the Gary, Ind., Tube works.

—o—

Lester Selig, who started work with General American Transportation Corp., Chicago, 33 years ago, has been elected chairman of the board. He was elected president in 1931, and vice chairman of the board in 1945. **Max Epstein,** who has been chairman, was elected chairman of the executive committee. **John P. McFadden** has been elected a director and vice president of the company, succeeding **Bennett Epstein,** retired. **Howard C. Westfall,** eastern manager for the Tank Storage Terminal Division of the company, has been elected assistant secretary.

—o—

Metal-Clean Solvent Corp., Chicago, announces the appointment of **Ernest Gerhart** as eastern regional manager. He formerly was metallurgist contact representative of the U. S. Steel Corp.; chief metallurgist of Reliance Division, Eaton Mfg. Co.; and more recently, chief metallurgist of Ingersoll Steel Division, Borg-Warner Corp. Mr. Gerhart will make his headquarters at Chicago.

—o—

Nine new directors added to the board of the Lone Star Steel Co., Daingerfield, Tex., are: **Watson Wise, Joseph Haddad, A. H. Genecov, Carl Shamburger, Dr. E. H. Vaughn, George D. Ramsay, Ellie Hopkins, O. T. Welch,** and **Clifton W. Brannon.**

OBITUARIES . . .

George W. Kreer, 59, president, Lafayette Steel Corp., Chicago, died Apr. 26 in Evanston, Ill. At one time associated with old American Sheet & Tin Plate Co., Pittsburgh, he joined the Chicago steel warehouse ten years ago as its head.

—o—

William P. Ross, 63, vice president and a director, Standard Tool Co., Cleveland, died suddenly Apr. 21. He had been associated with the firm since 1902.

—o—

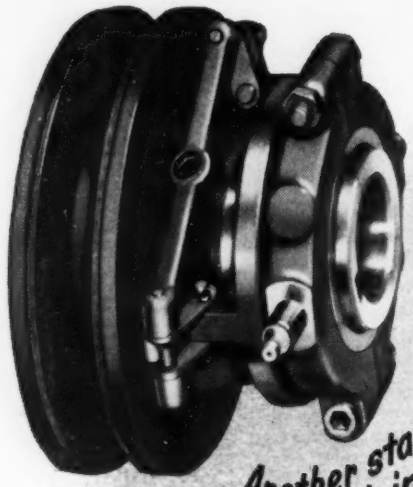
Wilson P. Hunt, 75, co-founder of Moline Tool Co., Moline, Ill., died recently.

—o—

Allan E. Goodhue, 70, a vice president and a director of the Chicago Pneumatic Tool Co., with offices in New York, died recently in that city after a brief illness. Early in his career he worked for the United States Pipe & Foundry Co. for six years, and then represented Midvale Co. in Boston. He joined Chicago Pneumatic Tool Co. in 1919 and became vice president in charge of sales one year later.

—o—

Swen W. Nelson, Buffalo office manager, Bailey Meter Co., Cleveland, died suddenly Apr. 12.



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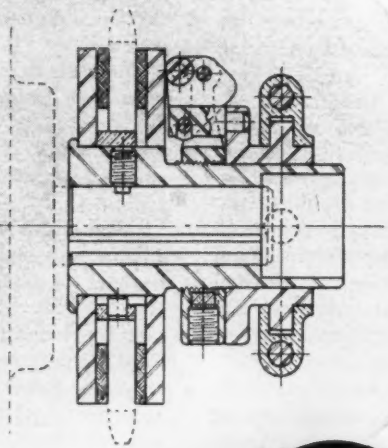
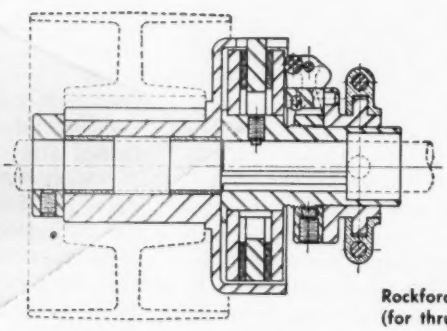


Rockford LMS Clutches (for plate sprocket drives)



Rockford LMT Clutches (for thru-shaft drives)

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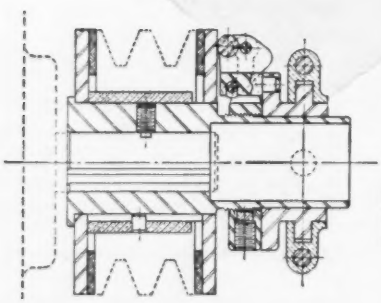
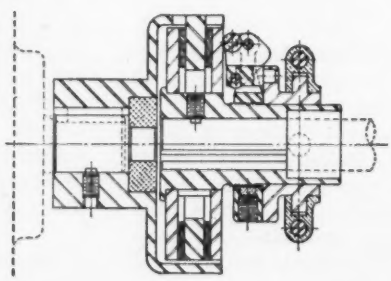
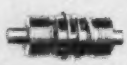


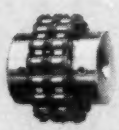
Rockford LMV Clutches (for "V" belt pulley drives)



Rockford LMC Clutches (for cut-off drives)



Pullmore Friction Clutches



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Engineering News . . . AT A GLANCE

PUSHBUTTON FUELING—Combustibles for dual-fuel engines can be changed by merely depressing a pushbutton on the latest style engine developed by National Supply Co.'s Superior Engine Division, Springfield, O. According to the company, all mechanical operations required in converting the engine from oil to gas, or vice versa, are made automatically through newly developed electric-controlled accessories operated by the buttons. While in operation, the engine gives no indication of fuel change-over whether under full or partial loads except by indicator lights above the two change buttons.

KEEPS WELDING "IN LINE"— With x-ray control of the spot welding process, it is possible to adjust welding equipment to operate more nearly in the center of the optimum range for the specific material and gage combination, it is pointed out by Robert C. McMaster, assistant research supervisor, Battelle Memorial Institute, Columbus, O. With such adjustment, wider variation of welder performance can be tolerated without the production of defective welds. Furthermore, any tendency toward variation of welder operation can be detected and corrected by radiography before rejectable welds are produced.

TOUGH LUBRICANT— Bearings of locomotive, passenger and freight car journals now may remain in service as long as 2 years without repacking through use of a lubricant developed by The Texas Co. According to a company announcement, the grease eliminates lubricant leakage and forms a seal against water, dirt, and wheel and brakeshoe dust. It is water-resistant and will not wash out, and even at low winter temperatures its starting and running torque is low.

GUILLOTINE—MODERN VERSION-Salvage of aluminum from obsolete and wrecked Navy warplanes is speeded up at the Norfolk, Va. Naval Air Base, through use of a huge 6100-pound cutting blade made from two thicknesses of 2-inch scrap armor plate. Impact it provides on each fuselage is the same as that of an auto crashing against a solid concrete wall at 40 miles per hour, although its terminal velocity is about 26 miles per hour. Inside width of the "guillotine" tower is 17 feet making it capable of handling any type plane, including seaplane hulls. The unit can handle about 16 planes per day, requiring the services of only four operators.

NO HUMAN ELEMENT— After leaving the cooling pits, tractor track pins in the Cleveland plant of National Acme Co., go to a hardening furnace where eight relays automatically feed them into the furnace by opening air valves that in turn operate pushers which do the actual feeding. Following a 15-minute treatment at 1440° F, the pins pass into a spray quench. Electrically-controlled ejectors kick each pin out after an 8-second quench. Pins leave the quench at the rate of three per minute, and are conveyed by an automatic conveyor to the inspection and packaging area.

INCREASES DIE PRODUCTION— Stainless steel and allied metal fabricating companies, that produce from a die thousands of pieces in which the finished product must have a perfect surface, stand to profit from a new alloy revealed by Ampco Metal Inc., Milwaukee. Tests, according to the company, have shown that the metal—about the same weight as steel—can be used in drawing operations as much as 82,000 times.

MEANS TO AN END—When constructing a jig for welding, one thing must be kept in mind that the jig is a tool—an accessory to the final product. Its fabrication, therefore, should be based on the least amount of materials, labor and parts necessary to do the job. In addition, it must be built to do a specific job. Some jigs, for example, are expressly designed for the setting-up job only. Others are for positioning the work. (p. 90)

MECHANIZED PROCESSING — Complete mechanization of Ford's radiator production line recently is now paying dividends two ways. Output is being increased by some 50 per cent and better radiators are coming off the line. Old laborious method of individually fluxing each assembled radiator, for instance, is replaced by a rotary fluxing fixture which includes nine stations and passes the cores under a bath of fluxing fluid that prepares fins and tubes for soldering. From the fixture, radiator cores are placed on a chain-driven "merry-go-round" that moves them through a gas-fired oven that bakes them at 580° F through a 6-minute cycle. (p. 94)

GATING—KEY FACTOR—Employment of a gating in the aluminum base alloy pressure molding process, it is pointed out, is instrumental in avoiding a host of undesirable irregularities. It permits the molten metal to fill the die cavity through a comparatively large orifice at a low rate of flow which eliminates turbulence. Metal that first fills the die cavity is always subjected to maximum turbulence. This initial metal is not permitted to remain within the die cavity to solidify, but is washed further into overflow pockets outside the die cavity with the result the metal that does fill the cavity is not subjected to turbulence and its ill effects. (p. 98)

LINE BOOSTER—Fast, efficient processing of extruded shapes and tubing to meet delivery dates—and Eastern competition—is insured through the use of small hardness testers in the production line at Reynolds Metals Co.'s Phoenix, Ariz., tube mill. In appearance, the instrument used looks like medium size pliers. It is capable of providing a nondestructive test on almost any surface within a reasonable thickness. (p. 104)

Jigs and Fixtures Facilitate

ECONOMIC MASS

No theoretical treatise, this down-to-earth discussion cites actual examples of how the use of positioners, fitting and holding devices saves one metal fabricator time and money—and how much

IN EVALUATING the worth of a method or procedure, we often overlook the part a tool or an accessory plays in making the method successful. In mass production of welded products, the efficient use of jigs and fixtures has in many instances doubled, trebled, and even quadrupled the unit output and at the same time brought many other economic benefits.

It would seem, then, that all plants producing welded products were taking advantage of this important tool. That this is not always correct is shown in a comparison of two plants, both producing a welded product and located within a short distance of one another.

Plant A pioneered and maintains leadership in welded construction of heavy machinery. Of necessity it has had to furnish the tools with which to do the job: Jigs and fixtures. In like manner this plant builds its own jigs. When a new model of a machine or an improvement is approved, the engineering prints of the structures are used as patterns for the jigs.

By utilizing the resources in its plant, such as materials, parts, labor and welding machines, this company builds its own jigs and fixtures. Many jigs have a total cost of less than $100 and have paid for themselves a hundred times over. By using standardized parts or "stock" items, jig building is made easier. Standard parts can be adapted to almost any kind of fixture and are usable over and over again. Most of the parts can be made in any small plant weldery.

Through hard-earned experience and time studies of its welding operations, this company knows that good jigs and good fixtures are profitable. To them such tools bring: Increased production at less cost; reduction of scrap; uniformity and standardization of product; increased safety factors; utilization of less skilled workers.

Plant B also manufactures a product that is designed for welding. It is fitted with all the equipment and supplies for an up-to-date weldery with one exception: Jigs. For some reason it has not seen fit to build its assembly line around fixtures to set up and weld its products. With squares, clamps and fasteners, the parts are set up on the floors and benches. Here all possible welding is done, after which the structure is turned by hand or crane so that the finishing job may be done. No fixtures or jigs are used for positioning the part to be welded.

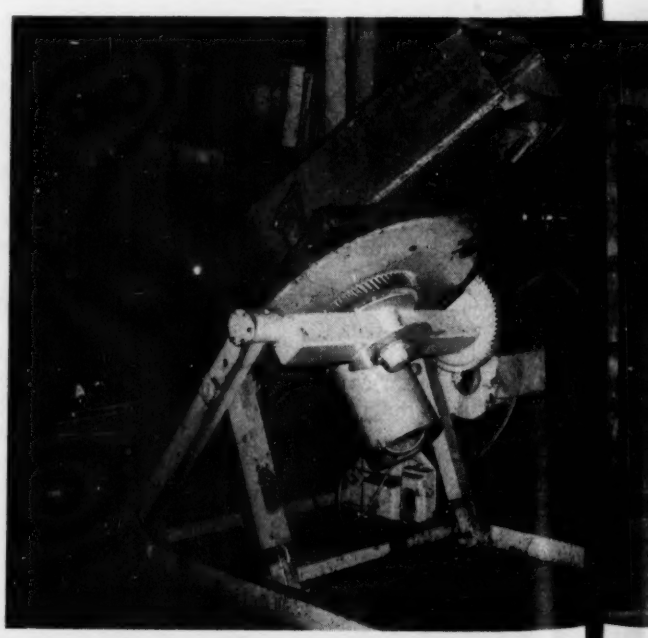
In these two illustrations we have an example of mass production and one of mechanical production. One plant is making use of all the known production tools for fabricating a metal product. The other is passing up an opportunity for improving and maintaining its position in the competitive field.

What Is A Jig?—Ask a dozen shop men this question and the chances are you will get a dozen different answers. Jigs, as such, are typically American. Eli Whitney is considered by some to be the father of the first planned jig. When Whitney set up mechanical aids to turn out a large order of rifles for the first Continental Congress, he set in motion the concepts that were later used to build America's gigantic production lines.

Someone once said that without jigs you have a job shop; with them, a factory. One of the first objectives of a factory is the production of a standard product: One that conforms in size, weight, shape and quality with the product that was built yesterday and that will be built tomorrow. A jig will insure this objective. Another factory objective is fast production at the lowest possible cost. Jigs also help to make this possible.

Products are usually made up of two or more parts. In a welding factory we fuse these parts together by arc welding. A jig, therefore, is any structure, device or machine that will accurately fit these pieces together, hold them tightly and position them in the most convenient way for economical welding.

Characteristics of a Jig—Keeping in mind that a welding jig is a tool—an accessory to the final product—its construction should be based on the least



SWELDING

By O. L. DUBIE
General Foreman, Welding Fabrication Dept.
LeTourneau Co. of Georgia
Toccoa, Ga.

amount of materials, labor and parts necessary to do the job. During the early days of the second World War, a group of British engineers was sent to the United States to study the possibilities of adapting a certain machine to production in England. After visiting several American plants, they expressed grave doubts as to their ability to do the job because of the time and cost involved in tooling up. Then they were taken to another plant where they were shown simple and inexpensive welded jigs that were turning out vital machines. They went away convinced.

Jigs are subjected to plenty of punishment. They must stand up to the heat from welding, the weight of the parts and the rough treatment that is dished out in most shops.

Ease and speed with which a part is placed in and removed from a jig will affect the savings that it contributes. It is obvious that such savings may be lost by the worker who has difficulty in placing the parts. If jigs are of a simple spinner type (one that turns the part over), they should be well-balanced so that they will position the part easily.

Accuracy must be built into the jig itself. If the parts are also cut by good jigs (templates, presses, dies, etc.), they will fit up correctly, eliminating the necessity of filler beads, slugs and oversize welds. Good fit-ups are a must for the use of "hot rods" of AWS, E6030 type.

Some jigs are expressly designed for the setting up job only. They are time-savers. Stop watch studies have been made of countless set-ups on the floor and then compared with set-ups on a jig. One such study showed that it took 15 manhours for a yoke arm to be completely set up on the floor. By the use of a jig that was built for this specific operation, the set-up time was reduced to 4 man hours.

Main purpose of a positioning jig is to hold a part and make it possible for the operator to turn it so that the welds may be placed easily and economically. Good positioning jigs make it possible to deposit metal in the down-hand position. With this jig, especially if it is a simple spinner type, the operator stands in one position and turns the part over for quick accessibility to the weld.

Usually positioning jigs should be built to meet the needs of a specific job. However, universal spinners will sometimes fill the requirements nicely.

Further economies and benfiits may be secured by building both of the above functions into a combination set-up and weld jig. Some of the advantages of such a structure are: Elimination of extra handling, saving of floor space, fewer welding machines

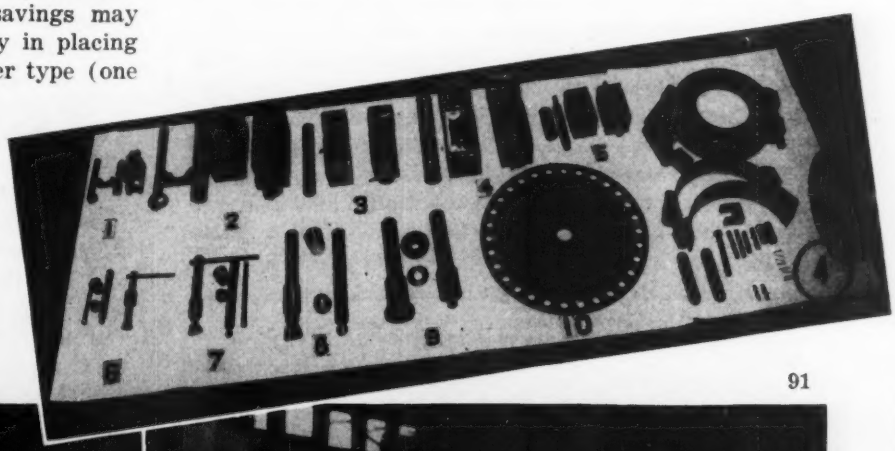
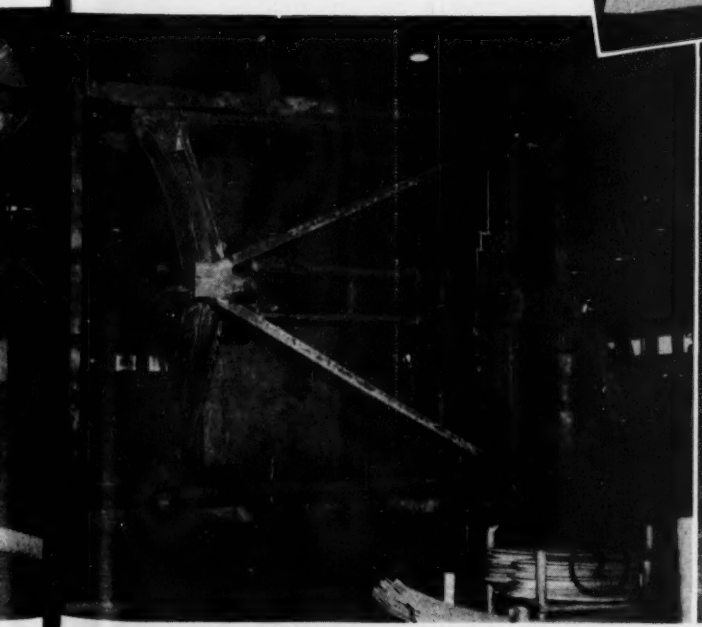


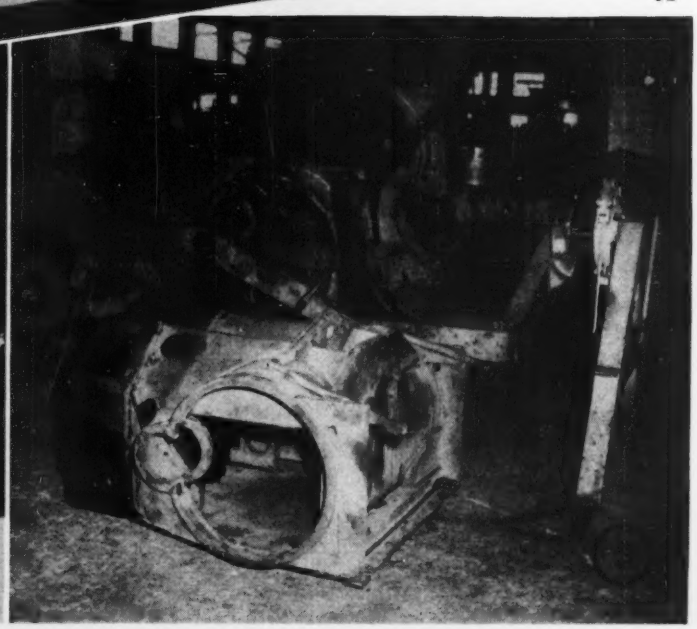
Fig. 1—Universal power positioning jig

Fig. 2—Spinner type jig

Fig. 3—Combination set-up and weld jig

Fig. 4—Group of standard or "stock" items used by jig and fixture department in building jigs





required, less manpower required, less distortion.

However, some plants find it advantageous to have a separate set-up operation, because they find it more economical to split the work and utilize the skill of each man. One has a skill for welding and another has an aptitude for setting up, eliminating the need for a more expensive combination man.

Economic Benefits of Jigs and Fixtures—So far in our review of the subject matter, we have dealt in generalities. Now let us examine some facts and figures that will lend weight and give authority to the statements that have been made. In doing this, we will attempt to verify the claims of increased production, reduction of scrap, increased safety factors and utilization of less skilled workers.

An apron is the door on the front end of a scraper. Time studies of this operation show the following comparisons:

Man-hours floor setup		17
Man-hours jig setup		4.5
Man-hours saved by jig		12.5
Labor cost, floor @ $1.00	$17.00	
*Labor cost, jig @ .80	3.60	
Unit labor savings		$13.40
Cost of jig (labor & materials)		233.31
Jig pays for itself in		17 pcs.
Production increased		377%

*Utilization of less skilled worker.

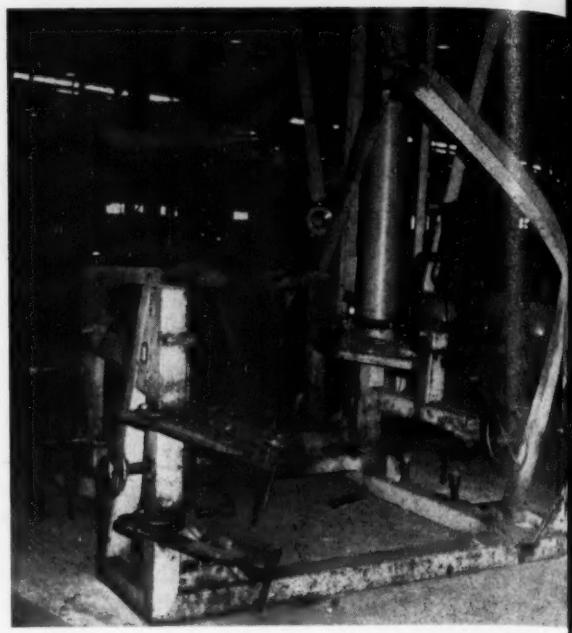
Another economic benefit to be considered is the safety factor. Jigs make it possible for the operator to stand on the floor for 75 per cent of his welding. Hazards of working beneath crane-suspended structures are eliminated. Safety records of Plant A show that in 7 years a total of 2,230,920 manhours have been rolled up in the welding fabrication department, with only 103 lost time accidents caused on or by a jig.

Still another factor is that of scrapped parts. Scrap may be reduced to a minimum when the welding is done on an accurate jig. This is guaranteed when the parts themselves are produced also from jigs such as template controlled cutting torches, etc.

Perhaps the best known example of the many advantages that come from the use of jigs is the utilization of less skilled workmen. Since the jig makes it possible for the operator to get the various parts

COST OF CONSTRUCTING APRON JIG IN MANUFACTURERS PLANT FROM MATERIALS AT HAND

Materials			
4 feet angles 6x6x½ 78 lbs. @ 2.86 cents		$2.23	
15 feet 11" angles 4x4x½ 156 lbs. @ 2.86 cents		4.46	
49 feet 8" angles 4x4x¼ 328 lbs. @ 2.86 cents		9.38	
125 feet angles 3x5x⅝ 1216 lbs. @ 2.86 cents		34.77	
93 lbs welding rod to fabricate above @ .07		6.51	
50 lbs welding rod to build jig above @ .07		3.50	
Oxygen, acetylene, and misc. supplies		6.50	
Labor for welding above parts into box beams		3.60	
Total			$ 91.38
Standard Parts			
1—Brake band structure		3.23	
1—Brake drum		4.20	
2—Bearing boxes	1.95	3.90	
3—Cotter keys	.02	.04	
2—Ferrules	.05	.10	
2—Axle shafts and support boxes	4.25	8.50	
2—Pin plates	.20	.40	
1—Pin	.20	.20	
1—Pin base block	.26	.26	
2—Apron hinge balls	2.21	4.42	
10—Clamp screws and nuts	.65	6.50	
Total			31.75
Labor			
Design of jig 24 manhours @ $1.52		36.48	
Building of jig 54 manhours @ $1.30		70.20	
Clean and paint (Includes both labor and paint)		3.50	
		110.18	110.18
TOTAL COST			$233.31



together in proper fits without measuring, a highly skilled man is not required. Less training time is required to teach a new man the down-hand position of welding.

Another advantage of jig welding is improved appearance. Here we get back to the down-hand position which almost always produces a better appearance than the horizontal, vertical or overhead positions.

Home-Made Jigs and Fixtures—Welding jigs and fixtures need not be expensive equipment. By welding the jigs from available material and with shop labor, the capital investment in tools is kept at a minimum. One great advantage of a welded jig is that in case of an error in its construction, most of the material may be salvaged for rebuilding. This is also true of a redesigned product, for with a cutting torch and some changes here and there a jig may be adapted to handle the new part satisfactorily.

Some plants maintain regular jig departments whose function is to design, build and maintain jigs and fixtures. Such a department is usually staffed with shop men who are skilled in welding, mechanics and drafting. Setting up such departments, whether they are one or more man affairs, is one of the most profitable investments an arc welding plant could make.

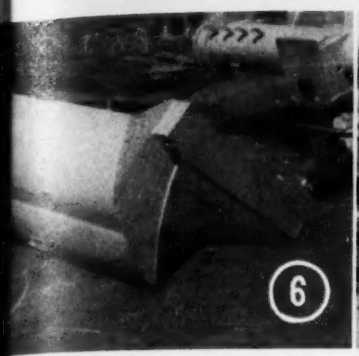
Jig Building—A new model of a machine has been designed for welding. Engineering prints are okayed and the necessary preparations made for getting the product on a production basis. A jig is needed on which to fabricate one part of the new machine.

This particular part is an apron, previously mentioned. An apron is a concave structure that is designed to be self-cleaning. Size: 9 feet wide, 5 inches high, 7 inches long: Weight—1100 pounds; 3/16-inch and ¼-inch plate steel is used.

Fourteen parts make up an apron:

1. Left apron arm, 2. Right apron arm, 3. Left outside apron side plate, 4. Right outside apron side plate, 5. Inside apron side plate, 6. Rear tie strap, 7. Cap plate, 8. Apron pay main sheet, 9. Rear pan reinforcement, 10. Front pan reinforcement, 11. Angle 3 x 3-inch ¼ angle, 12. Apron strip, 13. Hondo structure and 14. Square cut.

Our objective is to build a jig that will make it possible for an operator to set up and weld the above parts into a complete structure in the least possible



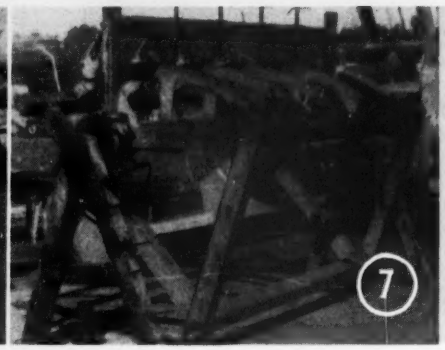


Fig. 5—Scraper body set-up jig. Note simplicity of design for easy set-up and convenience of operator

Fig. 6—Type E-16 apron

Fig. 7—E-16 apron jig

time with the highest degree of accuracy. The apron must be held within a tolerance of plus or minus 3/32-inch.

Jig building is a part of the production process of the new model mentioned above. When the engineering department releases the final prints, copies are sent to the jig department. Here jig drawings are superimposed over the prints of the part and a jig design is created.

It is here that such factors as weight of the part, distortion from welding, stresses, balance, and positioning of the part are taken into consideration. All of the characteristics of a simple and inexpensive jig are considered, and the finished job will bring the economic benefits mentioned in the first section. The jig builders will concentrate on producing a fixture that will be easy to operate, inexpensive in costs, simple and uncomplicated in structure.

An example of the jig department's analysis of the jig to be built is the thought given to the center of gravity of both the structure and the jig. The ease of turning depends upon a well-balanced unit. Counterweights add to the work of the welder and should not be used.

Next consideration in building our jig is that of materials or forms to be used. A number of standard shapes are available: Box beams, "I" beams, tubing, angles, channels.

Using the box beam, a form that is made of two like angles, the designer is assured good structural strength from any load angle. It does not have a tendency to twist or buckle. Its strength per pound is high. Box beams lend themselves well to joining and have four flat surfaces, making easy fit-up of clamps, stops, and plugs.

These shapes will be used for the entire main frame, clamp beam structure and the legs, the only exception being the curved bars which support the main sheet of the apron. These four bars are torch cut out of ½-inch plate by a template; they insure the proper radius of the apron main sheet.

Clamp requirements call for a special clamp to facilitate the removal of the apron. A holding clamp, it is not required to force the sheets into position. A cam lock type will be used. When the lock handle is released, the clamp bar will open beyond the required 90 degrees.

For the axle assembly group, standard 2-inch heat-treated shafts, standard bearing box, ferrules, cotter keys, brake drum and brake band assembly are utilized. These are "stock" parts made up in ample quantities for new jigs and spare parts.

For positioning the main sheet to the curved bars of the jig and the reinforcing plates to the main sheet, a box beam will be used with standard 1-inch clamp screws. The screw type is needed here because of the long distance traveled under pressure. This distance is necessary because the reinforcing plate is purposely rolled tight so that it can be forced down to the proper radius. This insures a tight fit to the main sheet.

Note that steps are built on the jig for the operator's convenience and safety. Angles are used there. Spots welded on the treads prevent slipping, and rounded corners minimize injuries to operator's legs and clothing.

Until all parts are in place on this jig, it will be unbalanced. For this reason we choose the brake type lock because of its smoother stops, increased safety, increased positioning factors.

Box beam structures are capped to keep operators from tossing rod stubs, into the openings. Also in case of storage outside, water would collect and possibly freeze and burst them during the winter.

After the jib is completed it will receive a serial number for inventory control purposes. This is done after the structure has been inspected and okayed for the production line. Another important treatment is painting of jig. Paint not only prolongs the life but brings other benefits. It reduces the possibility of an operator welding the structure to the jig and lights up dark corners of the assembly. Weld spatter drops do not stick to a painted surface as readily as they would on one that was unpainted.

Following is sequence of operations for building jig:

1—Setup and tack upper frame structure. 2—Setup and tack upper frame structure to lower frame structure and insert curved bars. Tack. 3—Insert and tack reinforcing box beam making sure that bars are in line. 4—Position and tack two reinforcing box beam braces to upper frame and 2 braces to lower frame. Position and tack corner gussets to lower frame brace and reinforcing beam. 5—Position and tack axle support beam to frame. 6—Position and tack corner box beam brace. 7—Position and tack axle support box.

8—Install brake drum to brake drum plate and shafts. 9—Build up two legs. Tack leg beams to axle bearing box. 10—Position and tack tie braces. 11—Position and tack steps. 12—Complete on legs. 13—Assemble legs to jig.

14—Position and tack stop mechanism anchor support to leg. 15—Position and tack clamp bar vertical supports. 16—Position and tack gusset from vertical support to axle support beam. 17—Drag bead jig all over. . skip to prevent warping. Repeat procedure and weld. (The exceptions are leg support beams, to be done after balancing, and stops.)

18—Check frame for warpage. 19—Check curved bars to see that they form a flat plane for main sheet. 20—Torch cut four holes for clamp support beam. 21—Position end "I" plates and weld. 22—Position top reinforcement angle and bottom reinforcing bar.

23—Position apron main sheet (At this point the apron is built along with the jig for the purpose of adjusting stops, etc., along with the jig.) 24—Position and tack cam clamps. 25—Position and tack inside wing plates of apron. 26—Position and tack apron arms. (These arms are built in another jig.)

27—Set apron arm stops and apron arm bearing balls. 28—Position and tack apron arm screw clamps. 29—Weld inside wing plates to front of apron main sheet. 30—Position and tack curved reinforcing plates. 31—Revolve jig, check for balance and axle alignment. (Keeping in mind that one man must be able to turn the jig easily with one hand.) Must be aligned so that legs will not cause the structure to walk. 32—Weld up remainder of jig. 33—Check structure.

From a prize-winning paper, 1947 contest, James F. Lincoln Arc Welding Foundation.

Radiator Output Increased 50 per cent by

Mechanized Processing

In addition to accelerating production, Ford's fully conveyorized line for building automobile radiators is expected to save an estimated 10 man-minutes per unit on assembly operations, reduce damage to fins

ASSEMBLY line techniques were adapted recently by Ford Motor Co. to build radiators on what is believed to be the automotive industry's first fully conveyorized line for volume production of these components. The completely mechanized process is used in the manufacture of radiators for 1949 Lincoln, Mercury and Ford automobiles.

Automatic processes are proving both efficient and productive of better radiators. Output is increased 50 per cent and will save the company an estimated 10 man-minutes per radiator on assembly operations. Modern materials handling methods eliminate to a large extent manual handling of subassemblies as well as bench operations which formerly were responsible for considerable damage to radiator fins.

Illustrative of improvements in manufacture is the procedure by which inlets and outlets are formed. Formerly, production of these parts required five separate press operations with three annealing cycles interspersed between the drawing operations. The entire process, from blank to finished part is now completed in ten progressive operations on the press shown in Fig. 1. After passing through stages of drawing, piercing and forming, parts are deposited automatically on a conveyor which carries them through a gas-fired annealing furnace.

Blanks in the progressive die operation are in disk form and are individually moved from one station to another by a shuttling bar. Dimensions of disks are 4¾-inches diameter and 0.34-inch thick.

Most of the basic methods formerly used in the manufacture of radiators have been kept in the new line. However, these operations are rearranged, simplified and mechanized to provide a straight line flow of parts to subassemblies and final assembly, testing, inspection, painting and shipping.

Top and bottom tanks of the radiator are made on double crank presses in order that a pinch trim die can be used. This eliminates the trimming operation which normally follows.

Illustrated in Fig. 2 is a battery of special tube-rolling machines designed by Ford engineers to pro-

1

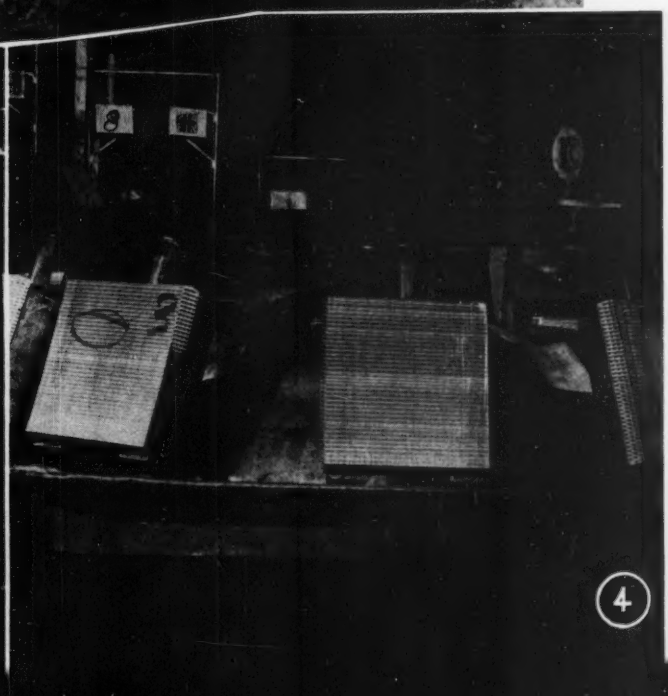
Fig. 2—Radiator inlets and outlets are formed completely in ten progressive operations on the automatic press shown here

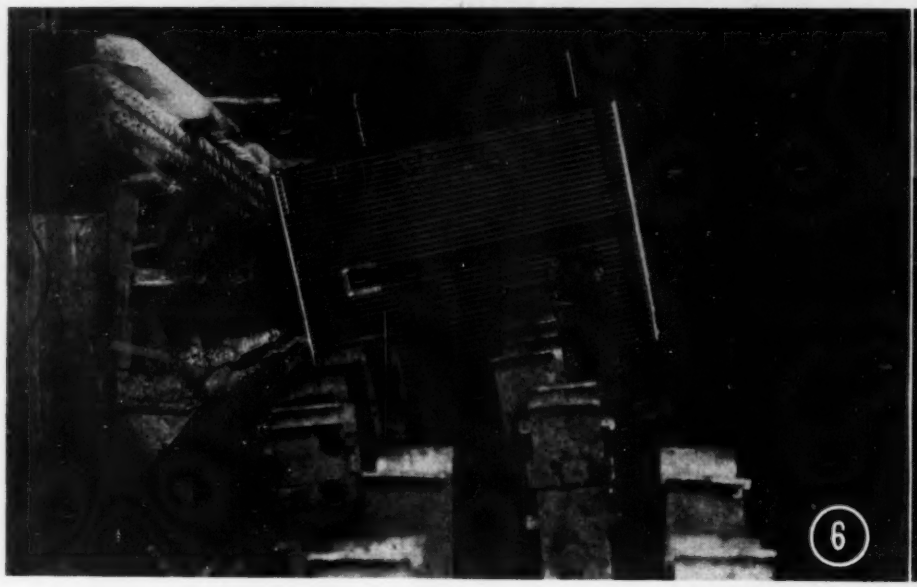
Fig. 2—Battery of special Ford-designed tube-rolling machines produce radiator tubes from flat, coiled brass stock by a continuous machine cycle at the rate of 60 per minute

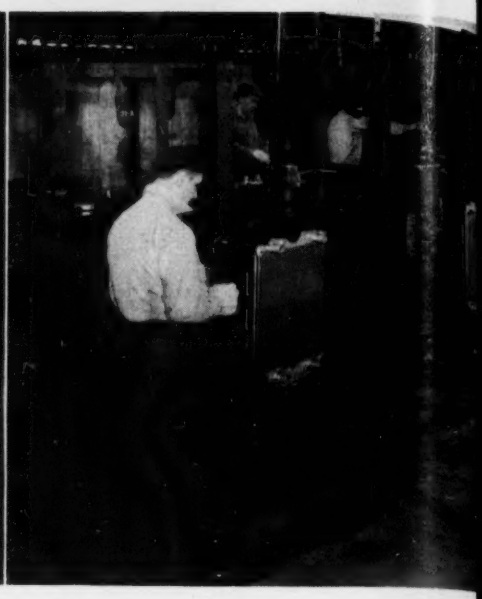
Fig. 3—Fins are formed from wide flat coiled copper stock on the presses shown here. In this operation, stock is rolled, seams formed and fins are pierced, cut to length and corners trimmed

Fig. 4—This rotary automatic fluxing fixture replaces hand fluxing, eliminating a laborious and time-consuming hand operation

Fig. 5 — After fluxing, cores are thoroughly baked and tempered at 580° F, during a 6-minute cycle in this oven







duce completed radiator tubes from flat, coiled brass stock by a continuous machine cycle at the rate of 60 per minute. From the feeding machine, shown here, the flat stock passes through forming rolls which bring it to the required flat tubular shape and also complete forming of the seam.

Cooling fins for radiators measure 3⅛-inches wide and 0.0035-inch thick. They are formed from wide flat coiled copper stock on the battery of ten presses shown here. In this operation, the stock is rolled, seams formed, fins pierced, cut to length and corners trimmed. Two complete fins are delivered by each press for each machine cycle.

Four different types of radiators are being made on the assembly line and, since radiator cores of the same dimensions may be entirely different in their cooling capacities, it has been necessary to use a color scheme that determines which radiator is which. This prevents errors and delays.

Formerly each operator assembled an entire core. Under the new assembly system the cores are placed on a waist high conveyor. Each operator inserts a few fins as the core passes him. The next operator inserts more and so on until all fins are placed. Cooling tubes are inserted in the same fashion in the next operation. At the end of the line the cores are combed and put on a rotary fluxing fixture, Fig. 4.

The rotary fluxing fixture replaces the old laborious method of individually fluxing each assembled radiator. The fixture has nine stations and passes the cores under a bath of fluxing fluid that prepares the fins and tubes for soldering. From the fluxing fixture the radiator cores are placed on a chain-driven "merry-go-round" that moves them through a gas fired oven and bakes them at 580° F each 6-minute cycle, Fig. 5.

Top and bottom headers are then placed on the radiator's water tubes and the cores are passed through a new automatic gas soldering oven, Fig. 6, that eliminates manual soldering or dipping. Conveyor holders are designed to slant radiator cores towards the soldering flame, first on one side, then on the other. One radiator passes through the oven every 6 minutes.

After soldering, the radiators are placed on special holders on another "merry-go-round" conveyor line that takes them through 15 different hand operations, Fig. 7. Each separate fixture enables the radiator to be turned to eight different positions while at the vertical, or put in the horizontal and turned in the same manner. Hand operations consist of soldering top and bottom tanks, overflow pipes, sidewall supports and other parts. The several components are progressively installed, aligned, fluxed and soldered as radiators pass down the assembly line shown in Fig. 7. At each succeeding station Fig. 8, the worker swings the fixture to different positions. With work placed in the most advantageous position, he performs his operation in the 21 seconds which it takes for each unit to pass his station.

When radiators are completely assembled they move to the testing tanks where operators insert stoppers, one of which pumps air into the core. The radiator is then immersed in the tank and tested for leaks. Repairs are made on the spot. Following inspection the radiators are washed to remove possible acid traces and then oven dried preparatory to painting. Sprayed with dull black enamel, radiators are carried by overhead moving conveyor into a huge baking oven where the paint is dried in a temperature of 220°F. Cores are shown entering the baking oven at the right of the operator in Fig. 9.

Fig. 6—Automatic soldering is accomplished without manual assistance in this conveyorized furnace. Loading end is shown here

Fig. 7—Final assembly operations are performed on radiators, traveling on this conveyor

Fig. 8—Each core is loaded in a separate fixture at the start of the final assembly line. As cores pass various stations on the conveyor, parts such at top tanks, side wall supports are progressively intalled, aligned, fluxed and soldered

Fig. 9—After paint-spraying, finished radiators are baked at 220° F in the huge oven shown at the operator's right

By JAMES L. ERICKSON
Lukens Aluminum Corp.
Dayton, O.

Structurally Sound

Provided by Aluminum Base Alloy Pressure Moldings

Outgrowth of the die casting process, pressure molding minimizes trapped air porosity, heterogeneous macro and microstructure, cold shuts and oxide inclusions by avoiding turbulence in casting

PRESSURE molding is the youngest and most promising outgrowth of the common die casting process. Born in 1942, out of a need for a process to produce a top quality aluminum base alloy die casting, pressure molding has since developed to the point where castings made by this process compete from a mechanical strength standpoint with heat treated sand cast and permanent molded aluminum base alloys, light metal forgings, cast and alloyed gray iron and even malleable cast iron.

Turbulence is avoided in the production of pressure moldings and consequently castings produced by this process are not host to undesirable irregularities. Trapped-air porosity, Fig. 1, heterogeneous microstructure and macrostructure, cold shuts and oxide inclusions are minimized with the result that the mechanical properties of the pressure moldings are extremely good.

By the employment of a gating that permits the molten metal to fill the die cavity through a comparatively large orifice and at a low rate of flow turbulence is avoided. The metal which first fills the die cavity is always subjected to the maximum turbulence. This initial metal is not permitted to remain within the die cavity to solidify, but is washed further into overflow pockets placed outside the die cavity with the result that the metal which does fill the die cavity has not been subjected to turbulence and its ill effects.

Suitable Alloys—Not all aluminum base alloys lend themselves to pressure molding. However, there are a number of these alloys which can be used in the sister process, die casting, but which are nevertheless "pressure-moldable".

Those aluminum base alloys which are either hot short or brittle at elevated temperatures cannot be pressure molded. On the other hand, certain of the aluminum base alloys which do not possess enough mechanical strength for die casting, lend themselves to pressure molding. When these alloys are pressure molded they are free of internal porosity and consequently may be successfully heat treated without dimensionally distorting. Consequently, heat treatable aluminum base alloys which are not hot short or brittle at elevated temperatures may be pressure molded and subsequently heat treated. Such heat treatment causes these alloys to manifest rather excellent mechanical properties.

Aluminum base alloys possessing the most advantageous pressure molding characteristics are, however, variations of the binary aluminum-silicon type alloys: 13A, 360A, Red-X-13, 380A, 43A, Red-X-10, etc. These particular alloys are host to exceptionally high mechanical properties in the pressure molded state. Certain of these alloys exhibit exceedingly fine eutectic even at high magnification (500X) and clear, well-developed aluminum dendrites. It is this homogeneous microstructure that accounts for the high mechanical properties these alloys manifest in the pressure-molded-state, Fig. 2.

No heat treatment will improve the mechanical properties of the pressure molded alloys Nos. 13A, 43A, 360A. All of these possess excellent ductility, and also very superior endurance strength.

Speed of Production—Aluminum base alloy pressure moldings are made with the aid of high-pressure (60,000-150,000 pounds) applied total load on the solidifying alloy. Cold chamber injection machines are used with rugged steel dies constructed to withstand the high injection pressures to which the molten casting alloys are subjected. These dies are of necessity designed to withstand sharp thermal and mechanical shock. Their construction calls for skilled die makers and expensive, precision die making machinery—and costly time. Dies are seldom designed, engineered, and built in less than 6 weeks. However, when they are completed (tested in a trial run and heat treated) the production of parts from the die or dies is a top-speed operation.

Dies are operated at rates between 30 and 400 cycles per hour. A single cavity die for example, may produce from 30 to 400 pressure moldings per hour—the exact rate depending upon the die's size and complexity. Large complex parts with extensive cross-coring are produced at the slowest rate. Multiple cavity dies operated at cycles of between 30 and 400 per hour may produce as many as 20 times the total number of individual pressure mold-

...ast Parts

...Alloy Pressure Molding

Fig. 1 — This photograph shows clearly how air may be trapped within a die cavity at points A and B by the incoming molten metal ray which enters at C and strikes the far wall of the die cavity only to double back on itself

ings per hour as a single cavity die might produce. A 20 cavity die may produce as many as 8000 individual pressure moldings per hour.

Ultimate Tensile Strength—Parts pressure molded out of such alloys as Alcoa 13A, 380A, 360A, and 218 have ultimate tensile strength values lying within the range 45,000 pounds per square inch to 55,000 pounds per square inch. Pressure molded parts of aluminum base alloys are comparable in regard to ultimate tensile strength values to alloy gray iron parts—whose ultimate tensile strength value range is 30,000 to 60,000 pounds per square inch. Aluminum base alloy pressure moldings possess ultimate tensile strength values equal to ASTM, Grade 32510 malleable iron parts.

Yield Strength—Aluminum base alloy forgings possess yield strength values in the range 30,000 to 50,000 pounds per square inch. The alloys 53 S-T, 25 S-T, and 17 S-T exhibit values near 30,000 pounds per square inch, and 14 S-T 50,000 pounds per square inch. Yield strength values of aluminum base alloy pressure moldings is comparable therefore to certain of the forged aluminum base alloys.

These pressure moldings are extremely ductile. This is perhaps their most outstanding mechanical property. For example, the alloy No. 13A in the pressure molded state has a value between 10 and 12 per cent elongation in 2 inches, No. 360A is between 9 and 11 per cent, No. 380A between 7 and 9 per cent, No. 218 between 8 and 10 per cent, and No. 43 between 15 and 18 per cent.

Alloy No. 13A in the pressure molded state has a Charpy impact strength value of between 5.0 and 6.5 foot pounds (¼ x ¼-inch), No. 43 is in the range 6.5-8.0 foot pounds, No. 380A in the range 5.5-7.5 foot pounds, No. 360A in the range 5.5-7.0 foot pounds, No. 218 a value of 15 foot pounds.

Brinell Hardness—Pressure moldings of aluminum base alloys have brinell hardness values of between 60 and 120. These hardness values are less than the values of cast gray iron, cast alloy irons, cast steel malleable irons, and aluminum bronze, but values greater than leaded bearing bronze, leaded red brass, tin bronze, yellow brass, leaded yellow brass, and values equal to manganese bronze.

Alloy No. 13A in the pressure molded state has an endurance strength value of 24,500 pounds per square inch, No. 43 23,400 pounds per square inch, No. 380A 25,500 pounds per square inch, No. 360A 24,600 pounds per square inch.

Aluminum base alloy pressure moldings are light in weight, their density ranging from a specific gravity value of 2.53 for the alloy No. 218 to 2.76 for No. 380A. Only the magnesium base alloys are lighter.

Machinability—In the first place, correctly designed aluminum base alloy pressure moldings require very little machining prior to assembly because they are molded to close dimensional tolerances (in general, plus or minus 0.005-inch per inch).

They machine easily. The reason for this is twofold: First, that type of hardspot that consists of

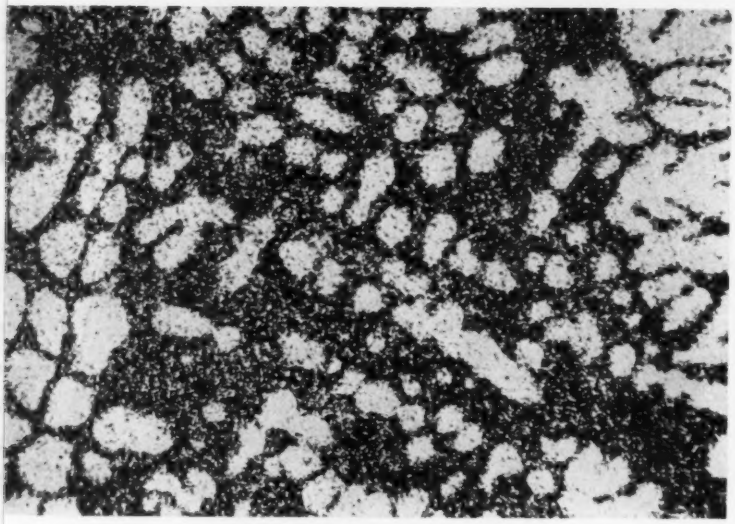


Fig. 2—Homogeneous microstructure shown here is typical of Alcoa No. 13A alloy in the pressure molded state

hard aluminum-iron-silicon and aluminum-iron components is absent in the alloy since the presence of iron in all alloys that are pressure molded is kept to a minimum. Secondly, the type of hardspot that consists of large, hard, primary silicon crystals is absent in the pressure molded alloy because the silicon does not crystallize in large crystals.

Pressure molded alloys No. 380A and No. 218 possess very desirable machining characteristics. Alloy No. 380A is readily machined with ordinary high speed cutting tools. Copper in this alloy hardens the aluminum dendrites in which a portion of it is retained in solid solution by the drastic quenching action of the pressure molding process. This retained copper reduces the tendency of the dendrites to cling to the cutting tools, while the presence of the remaining portion of the alloyed copper in the eutectic matrix and in complex intermetallic compounds tends to soften the general matrix with the result that the tiny silicon particles flow over one another during cutting and thereby reduce their "wear" on the cutting tools. Alloy No. 218 is readily machinable and never gives the machinist the slightest provocation for complaint.

Surface Finish and Definition—The moldings have excellent surface finish and extremely sharp definition. Because of their smooth surface finish, pressure moldings which have to be painted, plated, or just "shined", cost far less to polish and buff.

Definition is excellent: Moldings are readily made with small, intricate, molded-on lettering or ornamental decoration. The sharp definition obtainable by the method also means that small intricate parts can be furnished at no extra cost.

CHEMICAL COMPOSITIONS OF ALUMINUM ALLOYS USED IN PRESSURE MOLDINGS

Element	43	(1942) 13X	356
Si	4.5–6.0	10–12.5	6.5–7.5
Mg	0.05	0.05	0.4
Ni	...	0.05	...
Zn	0.10	0.10	0.10
Cu	0.10	0.15	0.2
Fe	0.80	0.80	0.60
Sn	...	0.05	...
Mn	0.05	0.05	0.1
Other Elements	0.20	0.10	0.2
Al	Rem.	Rem.	Rem.

One of the most outstanding characteristics of pressure moldings is solidity. Because they are free of internal porosity, they are ideally suited to the manufacture of parts which must have the property of pressure tightness.

Pressure moldings afford the designer the opportunity to core holes to tapping size, to core out areas of needless metal (thus reducing the part's overall weight), and to core slots, ridges, grooves, etc. for assembly purposes.

Inserts—Aluminum base alloy pressure moldings may be made with cast-in-place inserts. Such inserts may be employed to serve as (1) a bearing surface, (2) wearing surface, (3) cutting surface, (4) mechanical strengthener, (5) gear surface, (6) electrical insulating, or (7) electrical conducting surface, and (8) an assembly screw or lug. Employment of inserts often makes possible the production of a given part as a pressure molding at a cost much less than it could be made by some other method. Use of inserts often makes it possible to combine two parts into one unit, thus reducing assembly costs.

Tool and Mold Cost—Die cost for the production of pressure moldings is dependent upon the size, complexity, and intricacy of the part to be pressure-molded and upon the number of cavities required. Single-cavity dies for parts of simple design and average weight (0.5 to 1.5-pounds) and which call for no movable cores in order to cast them may be purchased for as little as $900.00. On the other hand very complex dies for aircraft carburetors may cost as much as $12,000 to $15,000. Cost of tools for trimming pressure moldings is also dependent upon the design of the part to be pressure molded.

Price of a pressure molding is determined for the most part by the weight of the alloy required and by the complexity of the die employed to mold it. The latter factor determines to a great extent the speed at which the die may be operated and therefore the rate at which the part may be molded. Pressure moldings are never sold by the pound although on the average their cost compares favorably with sand or permanent moldings.

Design—In designing for aluminum base alloy pressure molding, the designer must bear certain rules and facts in mind. These are really "design limitations", a knowledge of them enables the designer to take the greatest advantage of pressure molding as a rapid method for the production of high strength, light weight, precision parts. Here are a few rules and facts:

A. Weight: Max. 13 pounds.
B. Surface area parallel to the parting plane: 200 square inches.
C. Total surface area in all directions: 700 square inches
D. Wall thickness, large castings: Min. 0.070 inch.
E. Wall thickness, small castings: Min. 0.035 inch.
F. Variations from drawing dimensions, per inch of length or diameter: Min. 0.002* inch.
G. Cast threads: External, Max. number per inch 20.
H. Cored holes: Min. dia. in 3/32 inch.
I. Draft Per inch of length or diameter of cores: Min. 0.015 inch.
J. Draft Per inch of length or diameter at side walls: Min. 0.010 inch.

*Applies only to dimensions between points formed by solid portions of the die. When the dimension is across parting or between points controlled by parts of the die having relative motion, wider limits must be allowed.

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By OWEN LEE MITCHELL
Reynolds Metals Co.
Louisville

Production HARDNESS TESTING....

speeds manufacture of aluminum extrusion and tube products

DURING the war, many radical changes in equipment and procedures were necessary to meet unprecedented demands for vast quantities of aluminum, and to increase production efficiency. Today, practically the same conditions hold true except that the emphasis is heavier on efficiency —especially with plants in the position of Reynolds Metals Co.'s extrusion and tube mill at Phoenix, Ariz., which is forced to compete with similar mills located much nearer the center of the extruded shape and tubing market.

Extruded shapes and tubing, substantially, are manufactured to sizes and shapes specified by the customer. To insure fast and efficient processing in meeting delivery dates, the Arizona mill, after extensive experimental development work, recently incorporated production hardness testing as part of the manufacturing process to provide the desired production control.

To provide the desired production control, the plant instituted production hardness testing during the manufacturing process. After extensive experimental development work, it was concluded that Webster model B hardness testers would be the most desirable for our particular application.

Tester used, shown in the accompanying photograph is similar in appearance to, and approximately the size of, medium size pliers, it is sturdy enough to be carried in a supervisor's pocket.

Manufactured by R. A. Webster, Santa Monica, Calif., tool, or instrument, consists of an anvil upon which the material to be tested rests, a small pointed penetrator, a spring to furnish a controlled pressure against the penetrator, a gage to measure the depth of penetration, a dial to indicate the depth of penetration of the penetrator in 20 equal increments and a plier-like type of frame to apply pressure for testing.

To obtain a hardness reading, material to be tested is placed between the anvil and the penetrator, and pressure applied to the handle. Full penetration by the penetrator (i.e. soft material) gives a zero reading on the scale, while no penetration gives a reading of 20 on the scale. Pressure of the spring of the tester is designed to utilize the entire scale when testing the various aluminum alloys.

The instrument produces an indentation of such small dimensions as to be almost invisible, thus avoiding objectionable surface marking. Almost any surface within a reasonable thickness range can be given a nondestructive hardness test provided the surface is reasonably smooth.

The metallurgical division established mill hardness standards whereby the operating division obtains the hardness of every lot of strain-hardened material at the same time the dimensions are checked. By this means the various tempers of all tubing in alloys 2S, 3S and 52S, which constitute the major portion of present tubing production, can be immediately checked for conformance to the specified hardness range. In case of failure, physical test samples are taken and production is stopped until corrective action can be taken to insure the manufacture of acceptable material. In extreme cases where the material cannot be salvaged, the mill can immediately reschedule a shortage lot with a minimum of lost time.

Major portion of the extruded shape production consists of the "heat-treated" alloys 63S-T5, 63S-T and R361-T. The T5 temper is obtained by manufacturing under controlled conditions where a partial solution heat treatment (hardening and strengthening) is obtained during the extrusion process. Final strength is obtained by a low temperature treatment known as "aging".

The T temper, which is stronger than T5 material, is produced by subjecting the material to a high temperature solution heat treatment followed by an aging treatment. When permissible, the use of T5 material is desirable because of its favorable position in the price structure, due to the elimination of the relatively expensive solution heat treatment operation.

Control of the mechanical properties of 63S-T5 material is always critical due to the human element involved in manufacturing procedure employed. Thus, to keep test failures to a minimum, the guaranteed mechanical properties for this type of material are set at a relatively low level and the customer is informed that these properties will vary from lot to lot and even within the same lot of material. This penalizes

(*Please turn to Page* 126)

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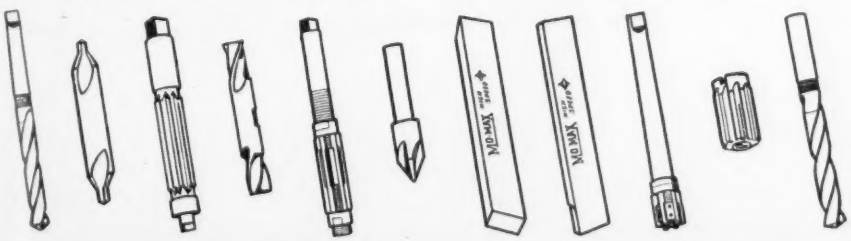
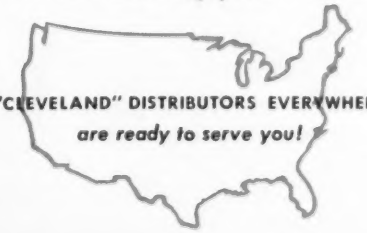
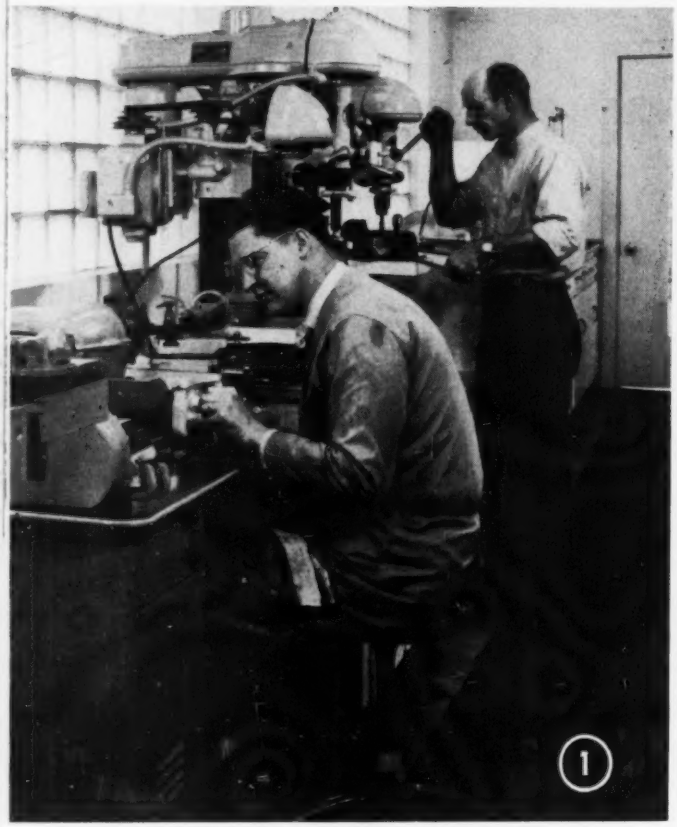






Detecting Residual Elements in Steel by

Spectrographic Analysis

Method of determining residual metals in the open-hearth bath during the refining period and of making qualitative and quantitative analysis of steel affords results in about 30 minutes. All elements that react favorably to the method are determined on one photographic plate. Description of new installation at West Coast plant

By HUBERT SWETT
Engineer of Tests
Bethlehem Steel Co.
S. San Francisco, Calif.

APPROXIMATELY 35,000 tons of steel suitable for products that require better than average commercial quality are produced annually at the S. San Francisco plant of Bethlehem Pacific Coast Steel Corp. The main requirements for these products are that they have improved surfaces and weldability, better hot working and forging properties, uniformity on heat treatment, etc. These steels are used in the production of a variety of products, such as machine parts, agricultural equipment, gears, electric motor parts, shafting, railroad equipment, cold headed material, bolts, rivets, etc.

In common with all open-hearth steel producers, a metallic charge of pig iron and scrap is used in the S. San Francisco plant. Approximately 20 per cent of the scrap originates as "home scrap", that is, scrap that is produced in the plant from normal processing of the steel product, such as, ingot butts, bloom and billet crops, etc. The balance of the scrap requirements must be purchased from various sources, such as railroads, public utilities, scrap dealers, etc. Scrap from railroads is generally high grade and is well suited for the production of quality steel. However, the quality of scrap from dealers can vary considerably, due to the various sources the dealer has to contact in order to collect the scrap.

When using purchased scrap of a heterogeneous character, the problem of quality control is complicated by the variable amount of residual or tramp elements that are in the scrap. The term, residual or tramp elements, refers to those elements that cannot be completely eliminated in the open-hearth process, such as, copper, tin, nickel, molybdenum, chro-

Fig. 1—Sample preparation room of spectrographic laboratory
Fig. 2—Micromphotometer for reading the densities of given elements

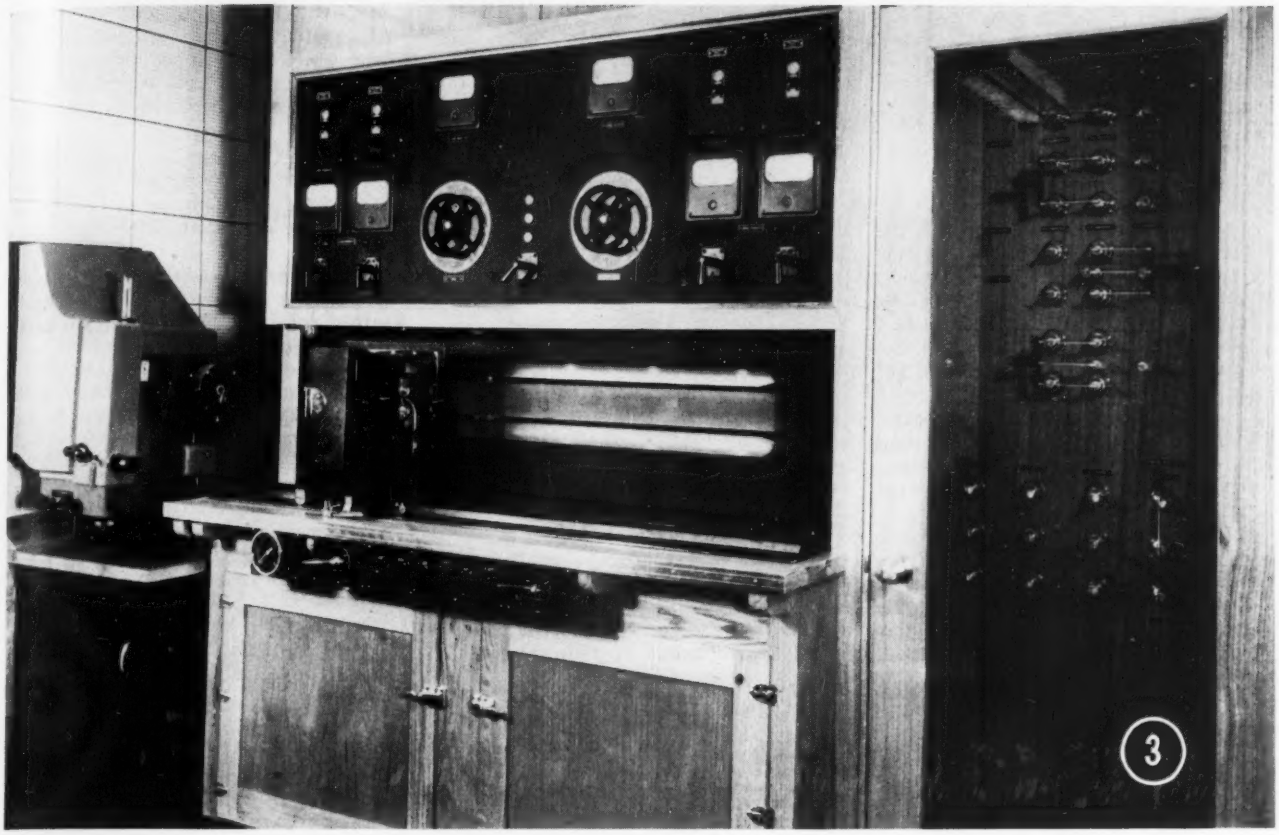


Fig. 3—Source room showing operating panel and spectrograph at left

mium, cobalt, arsenic, antimony, and tungsten. Copper and tin are particularly undesirable when the quality of the product is considered, both causing "red shortness", that is, the steel tends to crack or not hold together when heated to a red heat for rolling or forging. Chromium, nickel, and molybdenum, can influence the hardenability, and may or may not be desirable. Due to the amounts of scrap of doubtful or unknown origin which must be used, some of these elements may change the composition to such a degree as to prevent the material from being applied to quality production. This is particularly true at present on account of the large amounts of armament or war surplus scrap that necessarily has to be used due to the scrap shortage.

A well-established fact is that, with the proper equipment and personnel, accurate qualitative and quantitative analysis of a large number of elements present in steel can be made by the spectrographic method. It has been said that the "spectrographic methods of analysis have come into use in the steel industry because they provide a fast means of determining the chemical composition of the steel and that increased alloy contamination of the scrap makes it even more important to have a fast method of determining residual nickel, chromium, molybdenum, copper, tin in melt test."*

Until the introduction of spectrographic equipment, it was impractical to determine all of the residual elements in steel, due to the length of time involved and the extremely large force of chemists that would be necessary to do this work. The most obvious characteristics of spectrographic methods are their extreme sensitiveness (which permits the determination of many elements which are often undetected by more conventional methods), and the speed with which results may be obtained. All elements that react favorably to spectrographic methods are determined simultaneously on one photographic plate. When done by conventional chemical methods each element must be run individually. Once the necessary preparations have been made and standards and calibrations established, many analyses can be completed in 30 minutes or less. In the manufacture of quality steels it is of primary importance to know the composition of the molten steel during the refining period, and for control purposes the greater the speed with which an analysis can be made, the greater the possibility of accurate control. Although chemical methods of analysis are feasible for all of the important elements encountered in steelmaking, a large number of them require considerable time and expense, and therefore cannot be considered for control purposes. It is in this field that spectrographic analysis excels because of its accuracy and speed.

In order to better control the prod-

(*Please turn to Page* 128)

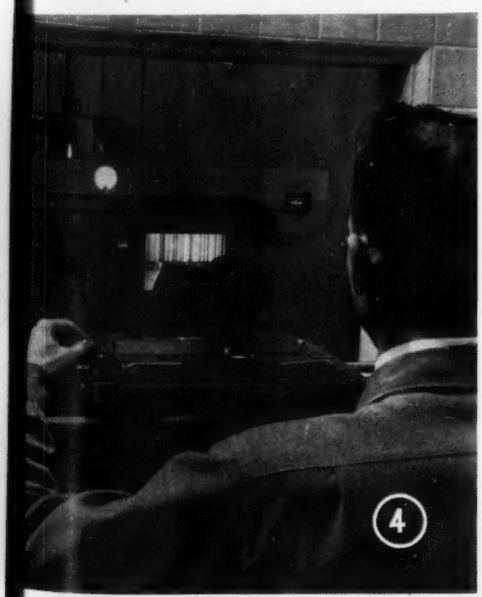


Fig. 4—Microphotometer showing a developed photographic plate with its various density lines

*Spectrographic Analysis of Residual Alloys in Steel by P. R. Irish, *Open Hearth Proceedings*, A.I.M.E., 1944, p. 264.

LETTERS *to the Editors...*

Scrap is Sunk

I have just read the editorial in the March 29 issue of STEEL entitled "Words and Deeds". It is indeed strange how we hear all about the crisis we are in and what probably must be done and should be done, and so on, but still we do not get any of the millions of tons of scrap from either Germany or elsewhere. Furthermore, what is far worse than that is that we read about our Navy taking a 300,000 ton battleship and scuttling it.

When I read about this, I wrote to our representative in Congress from my district and complained about it. I knew that he would reply that the Navy had to do it because the ship was radioactive. Thereupon, I went to one of the local atomic experts here in St. Louis, connected with Washington University, and he admitted that the Navy could have beached the battleship on any coral reef in the Pacific where it would have done absolutely no damage to anyone and certainly, in a comparatively short time, the radioactivity would have been dissipated.

We would then have a 300,000 ton pile of scrap that could have been reached if we really had to have it. As it is now, the Navy removed the 300,000 tons forever as far as we are concerned. To make matters worse, the following week there was an announcement made that there would be two more ships scuttled.

We have recently had a very disturbing experience regarding the activity of the Germans in the British sector. They are again offering machine tools in competition to us. Enclosed is a copy of my letter to Williard L. Thorp, assistant secretary of state for economic affairs.

Walter Siegerist, President
Medart Co.
St. Louis, Mo.

The following are excerpts from Mr. Siegerist's letter to Mr. Thorp of the State Department. ". . . We have been advised that a former German manufacturer, namely Kiesering & Albrecht, of Solingen, Germany, is again actively bidding for business against American machine tool manufacturers. The reason I say against American machine tool manufacturers is because the type of equipment we manufacture is not manufactured by the British. The only other European manufacturers were found in Germany and before the war it was impossible for us to sell any of our machines anywhere on the continent or in England, due to the fact that all German manufacturers were subsidized by their government. . . . This naturally was a shrewd move on the part of the German government because these machines are used only in steel and tube mills and consequently the location of a machine immediately, definitely located a potential war plant. . . . The question naturally arises in our mind as to whether or not our money is not being used indirectly to undermine American markets. Surely we need not fear anything from this type of competition if the British will price it to cover the cost of production, taking into account all the expenses of occupation as far as they are concerned. However, our experience with British competition has been very unsatisfactory when it comes to bidding for export business. . . . I would appreciate it if you would advise whether or not we may expect to continue to meet German competition directed by the British Occupation Forces. If this is the case, we certainly cannot understand why we should be expected to underwrite the British so that they can have the means with which to put us out of business."—The Editors

Rolling Mill Mfrs

Please, let me take the liberty of approaching you in my endeavor to get in touch with manufacturers of rolling mill machinery and equipment in the whole of the U. S. A.

As the owner of rolling mill patents, I should like to offer these to qualified and renown manufacturers and designers of such machinery and accessories. Will you, therefore, name me the correct address of such firms advertising in your magazine?

Rudolf Laquay
20b Braunschweig
Kasernenstr. 23
Brunswick, Germany

Rolling mill machinery and equipment manufacturers are listed in STEEL's Where-To-Buy Products Directory, available to all readers.—The Editors.

Separating Sheets

In the March 22 issue of STEEL, page 106, you very briefly pictured a magnet for separating steel sheets. Is there more information available on this gadget?

We have experienced considerable difficulty in separating oiled sheets in our stamping plant and this method appears to speed up or simplify the separating of such sheets. We would appreciate any information you can give us.

C. A. Lapp, President
Calbraze Tool & Die Co.
Cleveland 14, 0.

J & L is installing the setup in its customers' plants as a special service. Further information may be obtained from: Engineering Department, Jones & Laughlin Steel Corp., Third and Ross street, Pittsburgh.—The Editors.

Bigwood's, Of Course!

I am extremely interested in your article on page 112 of your March 15, 1948 issue, which describes the very efficient mill installation at Darlington & Simpson Rolling Mills Ltd. They are doing a grand job of work at Darlington and it is a clean tidy place to visit with surprisingly few human beings in evidence when work is in progress.

Possibly you will allow me to draw your attention to a matter of considerable importance to a rolling mill which somehow or other seems to have been glossed over not only by your writer in his article but also by many others in the steel trade from time to time. This particular question is the straightening, cold, of the rolled section. As a matter of fact, the Darlington mill sometimes turns out up to 90 tons of material per shift and these sections are straightened on roller straightening machines manufactured by this company.

Your author must be congratulated on his masterly brevity. "Necessary straightening machines are provided" —I really feel I must congratulate him.

The machines in question, some new, some quite elderly though these latter are still doing their job faithfully after many years arduous service, are of course so well known in Britain, and indeed in many other countries, that it may seem to him superfluous to have mentioned the name of the manufacturers. However, one could sometimes wish that the merits of this queer little country's products were not taken as obvious so frequently and if your writer could have added, as most steel mill people in England might have done, "Bigwood's, of course!", I, for one, would have felt rather pleased.

John B. Picton, Chief Sales Enneer
Joshua Bigwood & Son Ltd.
Wolverhampton, England

Who Makes Plow Disks?

We are interested in finding places where disks are made such as are used on plows used in this part of the country or in the wheat belt. They are 22, 24 and 26 inches in diameter. Any information you can give us will be appreciated.

J. W. Sier
Amarillo Foundry Co.
Amarillo, Texas

Melting Furnace

Could you kindly tell me if there is a company that makes a coal furnace with an iron pot to melt aluminum, in a size that will hold 200 to 300 pounds. If so, will you send me the address?

Frank E. Davella
85 South Day St.
Orange, N. J.

On Their Way

With reference to the article published as "Principles of Modern Heat Treating", in the issue of January 26th, written by Mr. R. M. Dyke, which is of much interest for me and my staff, I should much appreciate your forwarding two or three tear sheets.

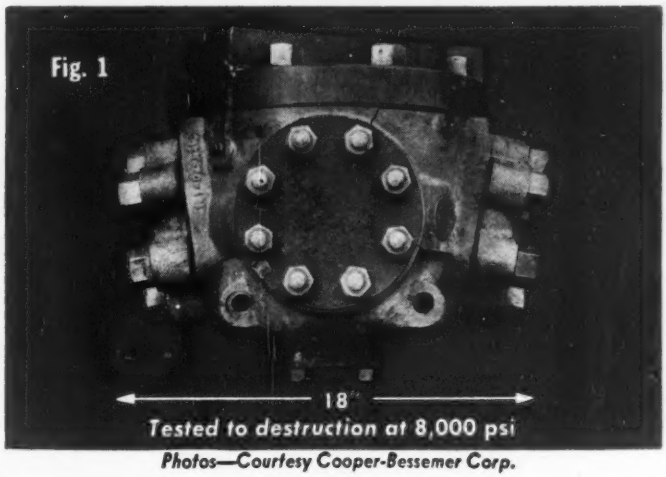
Harry A. Allevin
Metallurgical Engineer
Buenos Aires, Argentina

More Tear Sheets

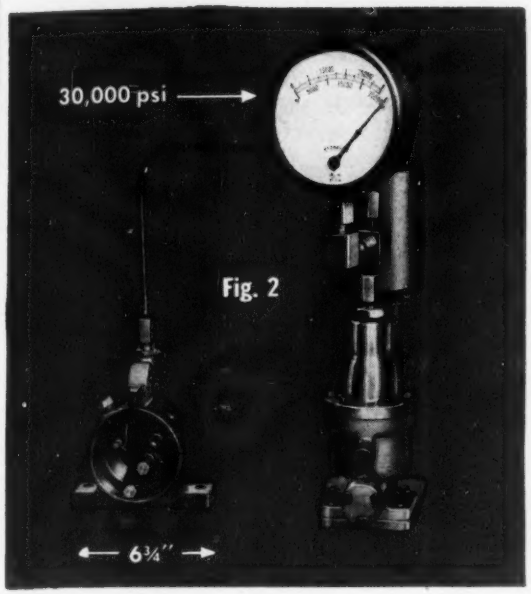
Please send me tear sheets of the article "Electric Furnace Operators Evaluate Steel Cleanliness", printed on pages 74, 76, 78 and 80 of your issue of 22nd December, 1947.

Charles R. Blick
Assistant Steel Works Supt.
Workington Iron & Steel Co.
London, England

To Withstand High Pressures with...



Photos—Courtesy Cooper-Bessemer Corp.



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E. W. Bliss Co.	Hastings, Mich. and Toledo, O.
Builders Iron Foundry Inc.	Providence, R. I.
H. W. Butterworth & Sons Co.	Bethayres, Pennsylvania
Continental Gin Co.	Birmingham, Alabama
The Cooper-Bessemer Corp.	Mt. Vernon, Ohio and Grove City, Pa.
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Florence Pipe Foundry & Machine Co.	Florence, New Jersey
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The Hamilton Foundry & Machine Co.	Hamilton, Ohio
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Pehlman Foundry Co., Inc.	Buffalo, New York
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Ross-Meehan Foundries	Chattanooga, Tennessee
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The Stearns-Roger Manufacturing Co.	Denver, Colorado
Traylor Engineering & Mfg. Co.	Allentown, Pennsylvania
Valley Iron Works, Inc.	St. Paul, Minnesota
Vulcan Foundry Co.	Oakland, California
Warren Foundry & Pipe Corporation	Phillipsburg, New Jersey
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"This advertisement sponsored by foundries listed above."

A CASTING to provide true pressure tightness must be made from a metal which is uniformly solid through all sections, and free from shrinkage and porosity at change of section.

Meehanite castings are produced under methods which scientifically regulate these factors.

The illustrations above are two typical examples of pressure castings, one of which was tested to destruction. The compressor cylinder head (Figure 1) has a minimum metal section of 1″ and is designed for operating pressures of 1500 psi. Under test it took 8000 psi to fracture the unit.

The hydraulic pump head (Figure 2) is shown being tested under a pressure of 30,000 psi. At this pressure it was impossible to break the head. The casting has an average section of 1″ and did not fail under test.

Adequate safety factors are thereby provided without depending upon excessively heavy section thicknesses and resultant weights may be held to a minimum.

Thus the careful metallurgical and manufacturing controls exercised in the production of Meehanite castings are utilized to solve many of the difficult problems involving pressure tightness.

Write for Bulletin No. 10 "Meehanite — the Metal for Pressure Castings."

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PERSHING SQUARE BUILDING • NEW ROCHELLE, N. Y.

Practice using 27 per cent oxygen gives maximum rate of production. Increase in output ranging from 20 to 50 per cent with fuel savings of 10 to 25 per cent is obtained where tests are specially supervised. Results of tests at Eastern open-hearth shop are presented

By J. S. MARSH
Research Engineer
Bethlehem Steel Co.
Bethlehem, Pa.

Oxygen Enrichment

Its Effect on Open Hearths

USE of oxygen for steelmaking in concentrations greater than that available in great abundance as air has been the desire for years. However, action was delayed for the lack of enough oxygen at a cost within reach of the steelmaker. Within the last several years enough has been available to permit large scale tests of its use for both combustion and decarburization.

The furnace chosen for the first tests made at the Bethlehem Steel Co. is of modern construction 82 feet 7 inches long and 23 feet 6 inches wide having a hearth area of 880 square feet. Checkers are two-pass, the chamber volume being about 8200 cubic feet and containing about 3900 cubic feet of checker brick. Heats average about 200 net tons. Oil is the only fuel and the grade of steel made is ordinarily common structural containing about 0.20 per cent carbon. High purity oxygen was piped to the shop in a 3-inch line from an adjacent plant at an average pressure of 270 pounds per square inch. A special panel was installed for measurement and control of flow to the furnace; measurement was by orifice meter and control was by air operated globe valves so arranged that reversal was automatic.

To evaluate the effect of oxygen enrichment, the furnace was made to compete with itself; that is, oxygen and nonoxygen heats were alternated. Oil flow was in the neighborhood of 500 gallon per hour after charging was begun. The flow was decreased somewhat during the lime boil; roof temperature, reached nearly the maximum allowable during this period. Scrap was charged in two drags; the gap between was caused either by floor or stockyard conditions. Hot metal was charged in two ladles. The total charge time from the start of scrap to finish hot metal of 1 hour 55 minutes, was not unusual for oxygen heats.

Data were collected on 241 heats from this furnace; of these oxygen was used on 94. Much of the work was exploratory in nature and involved experiment with burners of various design, variable enrichment, determination of the most satisfactory time for use of oxygen, and mode of its introduction. Since conclusions drawn from such experiments were upheld by subsequent work it will be useful to state some of them at this point because they help in arriving at an understanding of the behavior of oxygen enriched furnaces.

The first burner tested was of the type ordinarily used for the combined burning of liquid fuel and coke-oven gas, which is to say it consisted of two concentric pipes within a water jacket; the inner carries the liquid fuel and the outer the gas, which, in this instance, was oxygen. Consideration of heating by radiation leads to the conclusion that the relative positions of fuel and oxygen streams are not critical and it subsequently developed that this burner performed as well as any other. However, various nozzle forms were tried. The object, of course, was to increase the quantity of heat flowing downward as compared with that radiated upward toward the roof. So far as heat time was concerned, there was little to choose among these burners.

On another test furnace, the fuel and oxygen orifices were recessed a few inches from the end of the water jacket; by some quirk of stream flow, the oxygen stream was inverted, for the hottest part of the flame was on top. Yet, the roof was not burned and heat time usual with enrichment resulted.

The degree of enrichment first tested was arbitrarily established at 27 per cent. Increase to 33 per cent resulted in no gain. Enrichment to 25 per cent was tried, with results nearly the same as for 27 per cent. This suggests that the first increments of oxygen added produce the greatest effect. Quantitative information is given later.

A few heats were made by introducing the oxygen at the air intake; results confirmed the preliminary analysis in that, as compared with burner injection, gain was small, more oxygen was consumed, and no fuel was saved. The remainder of the tests were therefore with burner injection.

For the initial heats, oxygen was turned on at the start of charge. However, owing to mechanical limitations, rate of heating exceeded rate of charging. The overall effect of this was merely to waste oxygen; consequently, for subsequent heats, enrichment was delayed. By trial and error it was found that waiting until the scrap was about one-half charged resulted in no loss of heat time and substantial saving of oxygen. Similarly, it was found that the most satisfactory time for stopping enrichment was about at the start of hot metal charging. This meant a total flow of oxygen for about 2 hours for all furnaces on hot metal charges. It will be noted that the end point found by experience is con-

sistent with the conclusion from consideration of heat transfer.

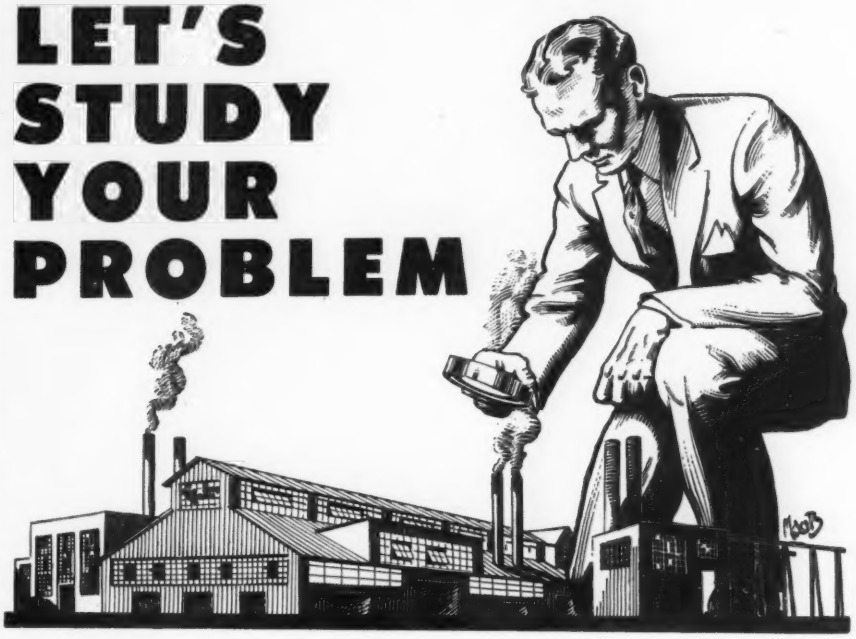
It is well known that the productivity of an open-hearth furnace is highly dependent upon the skill and judgment of its operators. Ordinarily the pace is set by a number of factors, including the durability of refractories. Under special circumstances, however, furnace productivity can exceed by substantial amount that which can be maintained. This fact must be taken into account, especially if the number of tests is relatively small. For example, during the first tests, it quickly appeared that the alternate nonoxygen heats were being made in shorter time than usual; this suggested that the furnace "remembered"—that is, that heat was stored and carried over. However, the immediately adjacent furnaces also began to produce heats in shorter time than usual; the inescapable conclusion, then, was that novelty and competition were responsible, rather than carryover of heat. To repeat, such a pace cannot be maintained indefinitely. At all events behavior was therefore judged by comparison of oxygen and nonoxygen heats on the same furnace rather than by comparison with previous behavior of that furnace. This practice was followed also with tests on other furnaces; otherwise, gains from enrichment would have been fictitiously high.

Constant Charge Maintained

Attempt was made to maintain a constant charge, which consisted of approximately 60 per cent hot metal, 33 per cent scrap and 7 per cent (metallic) ore. Five different burners were used and enrichment ranged up to 33 per cent oxygen. The highest enrichment permitted increased fuel flow (up to 650 gallons per hour) but no production gain over that from 27 per cent resulted, and refractories were endangered. On the average, the oxygen heats were 20 per cent faster with a fuel saving of 10 per cent, as compared with the alternated nonoxygen heats. Fuel saving is ascribable only to faster melting, because refining time was normal. Nothing unusual was noticed about refractory wear; to be sure, the furnace operators had to be more alert because of increased tempo, but that was all.

Since the gain from oxygen enrichment results from faster melting, high-scrap charges should show most effect. The effect of variation of the fraction of scrap in the charge was investigated in a congested shop containing 21 furnaces. The test furnace is of about 725 square feet hearth area and taps heats in the

LET'S STUDY YOUR PROBLEM



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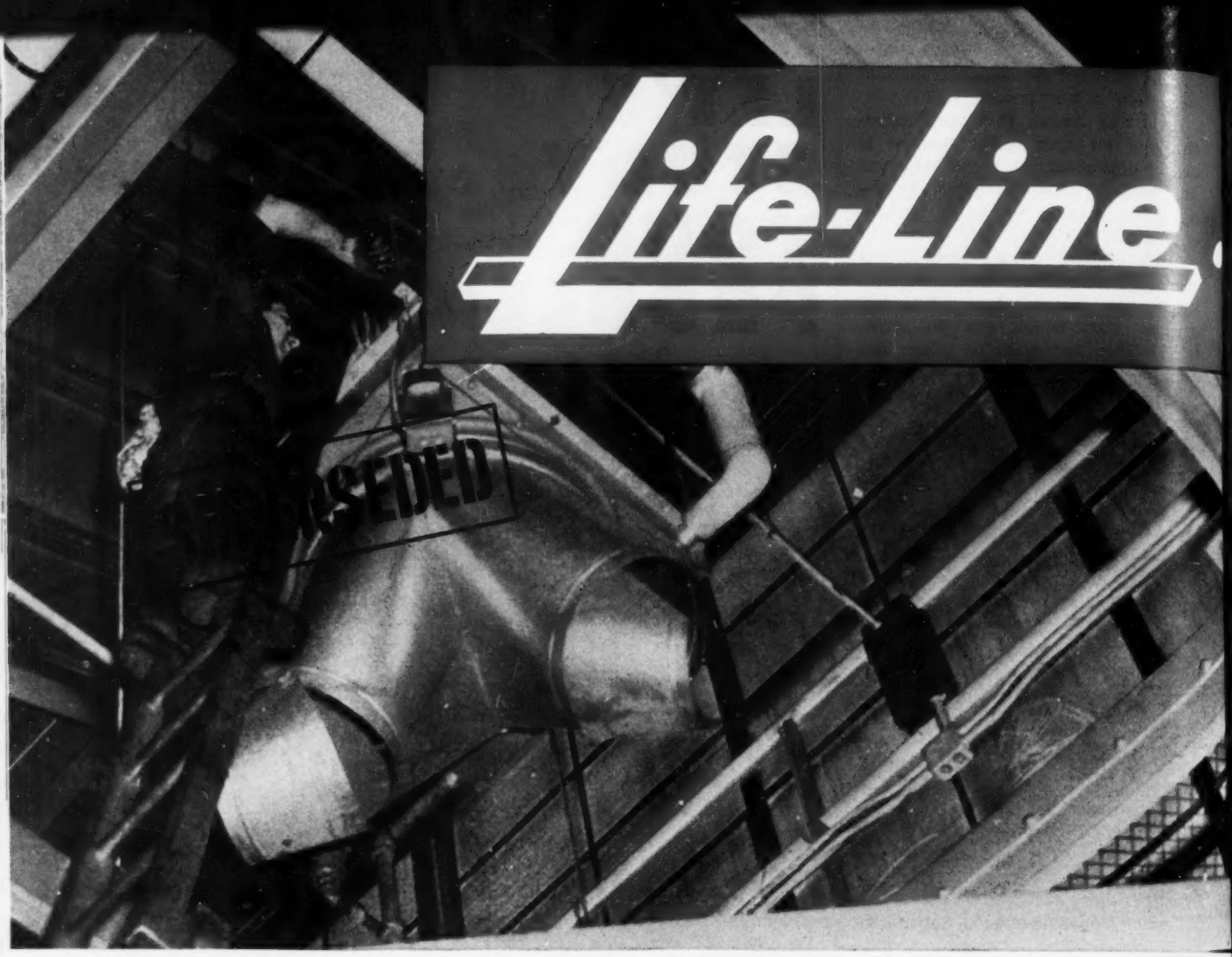

HAZARDOUS CLIMBING by maintenance men to lubricate motors mounted overhead in hard-to-get-at places, is done away with for periods of five years or more with Life-Line motors. Pre-lubrication eliminates need for customary 3 t 9-month greasing. Seals prevent lubricant from escapin from bearing regardless of mounting position of moto

FREQUENT DISASSEMBLY of machinery housings to reach inaccessible motors for greasing is no longer necessary. Life-Line motors are pre-lubricated—need no further checking for five years—or longer. Production interruptions are reduced—as well as danger of neglected bearings.

TORTURE CHAMBER. Grueling tests like this in "torture chambers" of hot, whirling emery dust for extended periods of time—far more extreme than encountered in usual service—prove that bearing seals prevent entrance of damaging dust. Grease showed no trace of emery dust after test.

INDUSTRY'S MODERN, PRE-LUBRICATED MOTOR SUPERSEDES OLD METHODS OF MOTOR MAINTENANCE

Forget your previous ideas about maintenance! Traditional means of maintenance were discarded when the Life-Line motor was designed.

Today, as a result, many of the most troublesome items of motor maintenance can be eliminated. Life-Line motors do away with need for frequent greasing attention. Pre-lubricated bearings seal grease in—keep dirt out—need no attention—for five years or more. Danger of bearing burnouts by overgreasing is eliminated.

Pre-lubrication is just one of the ways that Life-Line motors bring totally new benefits to builders and users of motor-driven equipment. Heavy structural steel gives new shock resistance . . . cuts space requirements as much as 35% . . . provides up to 134% more torque per pound of weight. New stator slot designs and insulating materials give new and higher electrical strength.

Life-Line motors, now built in sizes from 1-15 hp, are available in standard and near-standard types from stock. Soon other Westinghouse integral motors—up to 200 hp—will be changed over to modern Life-Line design. Check your nearest Westinghouse office for deliveries—or write for full details, to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

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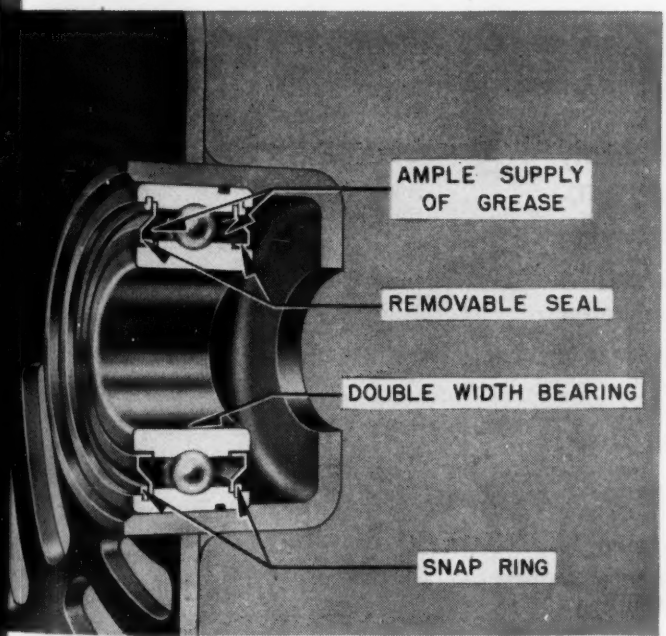
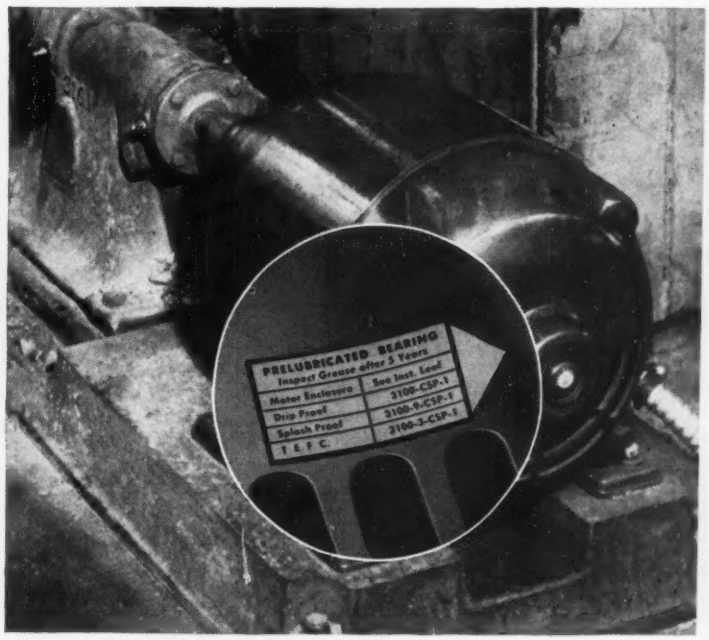
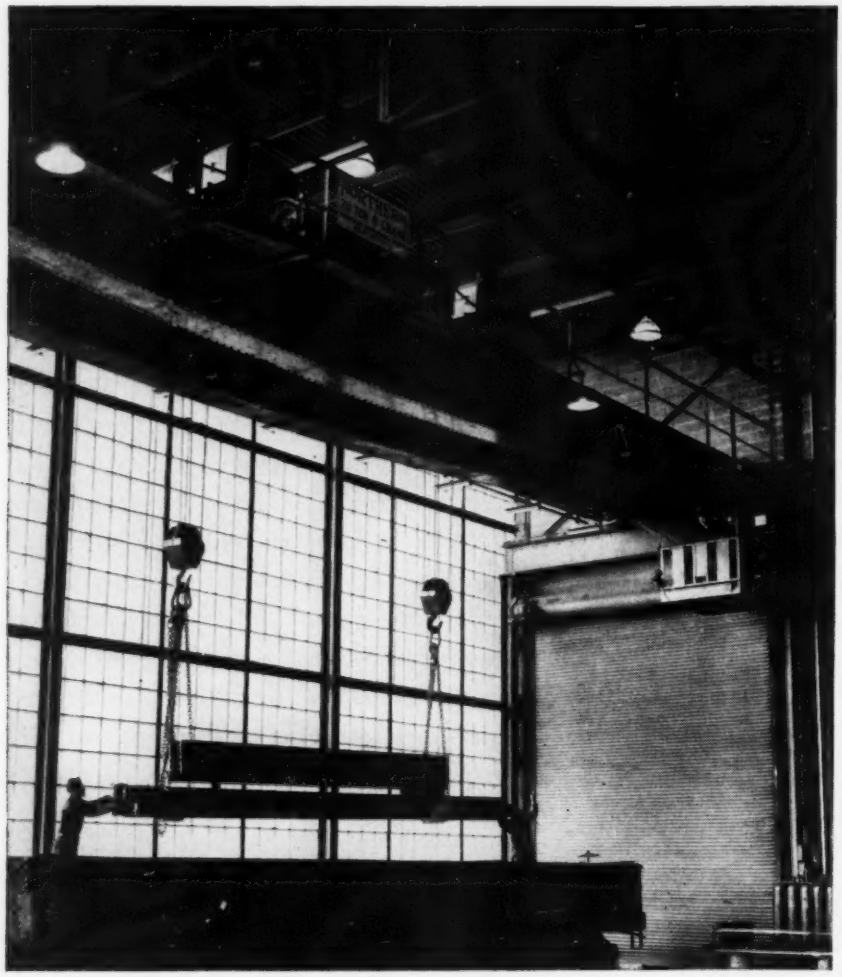
Life-Line motors



DIRT STAYS OUT—grease stays in! Pre-lubricated sealed bearings eliminate grease seepage . . . insure adequate lubrication . . . prevent "straight-through" grease waste and starved bearings that are possible where grease inlets are located directly over grease outlets as in many ordinary designs.



FORGET IT—FOR 5 YEARS! Westinghouse pre-lubricated bearings have been field-tested and proved for many years in the hot, lint-laden atmospheres of textile mills. *Many have been in continuous operation for over ten years without attention—positive proof of pre-lubrication savings!*



To cut Costs where costs start

NORTHERN OVERHEAD ELECTRIC CRANES

When that hard-to-get, high priced material finally reaches your plant a NORTHERN OVERHEAD ELECTRIC CRANE will start cutting costs in your Receiving Department—by giving material flow a fast start to Processing—setting the pace which adds up to better teamwork, faster production, and faster inventory turnover.

It means quicker release of overtaxed rolling stock.

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OVERHEAD ★ ELECTRIC CRANES ★ AND HOISTS ★

NORTHERN ENGINEERING WORKS

2615 Atwater St., Detroit 7, Mich.

neighborhood of 135 tons; its fuel is oil. Oxygen was supplied to a special station by trailer truck. Aiming at a total metallic charge of about 300,000 pound scrap charges were 85,000, 100,000 and 125,000 pounds, respectively.

Scrap-charging time was rapid. To be sure, one advantage of oxygen enrichment is that faster melting permits charging to proceed without delay, yet it is certain that part of the average difference of 1 hour 14 minutes between oxygen and nonoxygen heats is ascribable to the favoring of the former. Since scrap cannot be melted until it is in the furnace, charging time has an effect on heat time and part of the 50 per cent greater rate of production shown for the oxygen heats is ascribable to faster charging. The physiological factor was responsible also for part of the shortened refining time of these particular oxygen heats, as compared with that of the nonoxygen heats; this sort of thing disappears under routine practice and is mentioned only to discourage misplaced emphasis. Even so, the tonnage-rate and fuel gains (approximately 50 and 25 per cent, respectively) were high compared with those cited for the 200 ton furnace (20 and 10 per cent, respectively). This suggests a furnace factor, for which additional evidence was found and which is discussed later.

Heat Time Consistent

Oxygen enrichment tended to smooth out ordinary variations of melting time. A remarkably consistency of heat time was noted for the first test furnace, which was charged uniformly; here was evidence that, within limits, oxygen tends to maintain that consistency despite variation of scrap charged. In retrospect, this is not entirely inexplicable; a detailed heat balance will show that heat requirement per ton of steel produced is nearly independent of reaction of scrap charged. This results from the fact that increased reaction of hot metal charged is necessarily accompanied by increased reaction of ore and the ore reaction just about consumes the extra heat charged with the hot metal. The observed longer heat time with the higher scrap charges is therefore ascribable to (a) the longer time required for charging and (b) slower overall rate of heating of a voluminous mass of scrap.

Oxygen here is helpful in several ways; especially important is the fact that it compensates for the low air temperature resulting from the chilled furnace that inevitably accompanies charging. The high rate of melting permits continuous charging

Christopher Columbus landing in the New World October 12, 1492.

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Columbus' discovery proved to be one of the most valuable discoveries in history . . . and *Bayflex Raised Hub Disc Wheels* have proved to be a remarkable "find" too, by foundries, welding shops, metal fabricating shops, automobile and truck body repair shops, for removing unwanted metal *faster — easier — cleaner.* Operators are pleasingly surprised with production possibilities and their increased piece-work earnings.

Bayflex discs 1/8" and thicker are made of multi-layers of cotton fiber loaded with sharp abrasive grit — flexible yet extremely strong — can be used for edge as well as surface cutting giving "40 to 1" life, and more, over conventional discs.

Words cannot fully describe this new wheel, you must see it in operation. Send coupon today for a demonstration.

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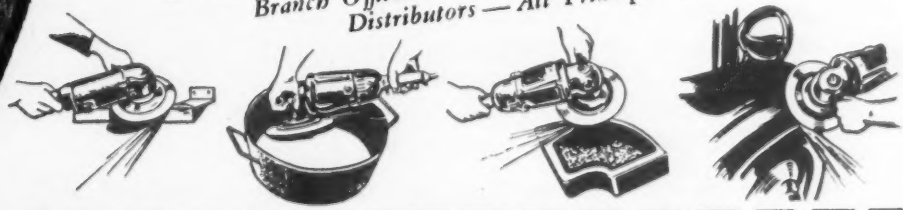

BAY STATE ®

Bay State Abrasive Products Co. Westboro, Mass.

Please have your representative call just as soon as possible to demonstrate Bayflex Raised Hub Disc Wheels. It is understood that this will not obligate us in any way.

Company.....

Street.....

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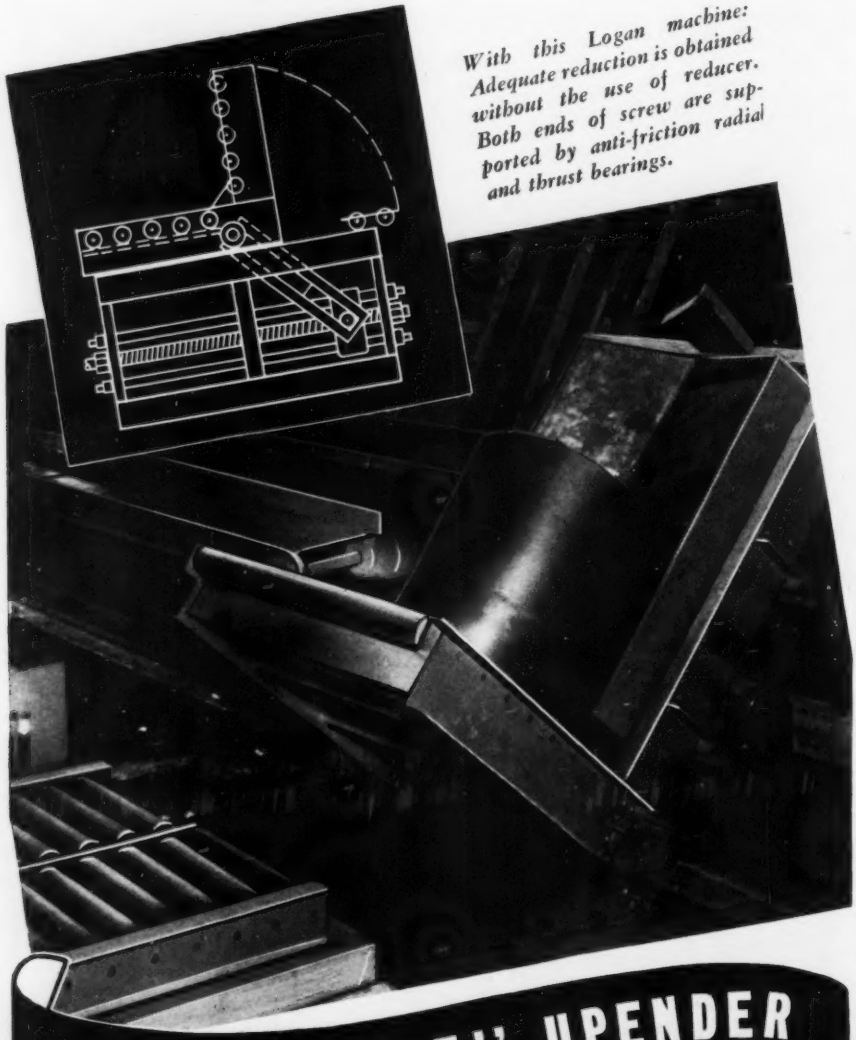

With this Logan machine: Adequate reduction is obtained without the use of reducer. Both ends of screw are supported by anti-friction radial and thrust bearings.

"SCREW TYPE" UPENDER

... an exclusive Logan feature

DEVELOPED by Logan, and proved over the years by installations in some of the nation's leading mills, the Logan "Screw Type" Upender offers the following exclusive advantages:

(a) Positive operation — in case of accidental power failure, carriage automatically locks in any position. (b) Coil travel may be stopped purposely in any position. (c) Massive pivot shaft takes the loading shock when loading or unloading by crane. (d) This "screw type" machine can be adapted readily to lateral discharge. (Logan patented down-tilt, side-tilt.)

Recent refinements in design have made maintenance a simple job and have added even greater strength at key points. Logan also can furnish the ordinary gear segment type upender. Complete literature on request.

SINCE Logan 1875

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LOGAN CO., INC., 535 CABEL ST., LOUISVILLE 6, KY.

and the overall effect is the tendency to melt in the same time elapsed from the start of charge. It follows, then, that oxygen does produce the greatest effect on the higher scrap charges. It must be emphasized, however, that this inherent advantage of oxygen is useful only if shop conditions permit rapid charging.

An extreme of charge variation was obtained by using oxygen on cold-charge furnaces tapping about 60 tons. The metallic charge consisted of scrap and about 10 per cent pig iron. These furnaces normally produce at a rate of about 6 tons per hour. Enrichment varied from 23 to 27 per cent. However, by selecting conditions that were best and worst, by using one new and one old furnace, it was felt that sufficient information was obtained. The behavior appears to have been about like that for the larger furnaces with scrap-hot metal charges; in other words, say about 25 per cent increased tonnage and about 15 per cent fuel saving.

Degree of Enrichment

The furnace used for investigation of the effect of variation of reaction of scrap charged was used also to obtain further information on the effect of degree of enrichment. The enrichment of 27 per cent chosen for the initial tests on the 200-ton furnace proved to be about as effective as the richer mixtures. This value was substantiated on the 135-ton furnace, based upon 57 heats.

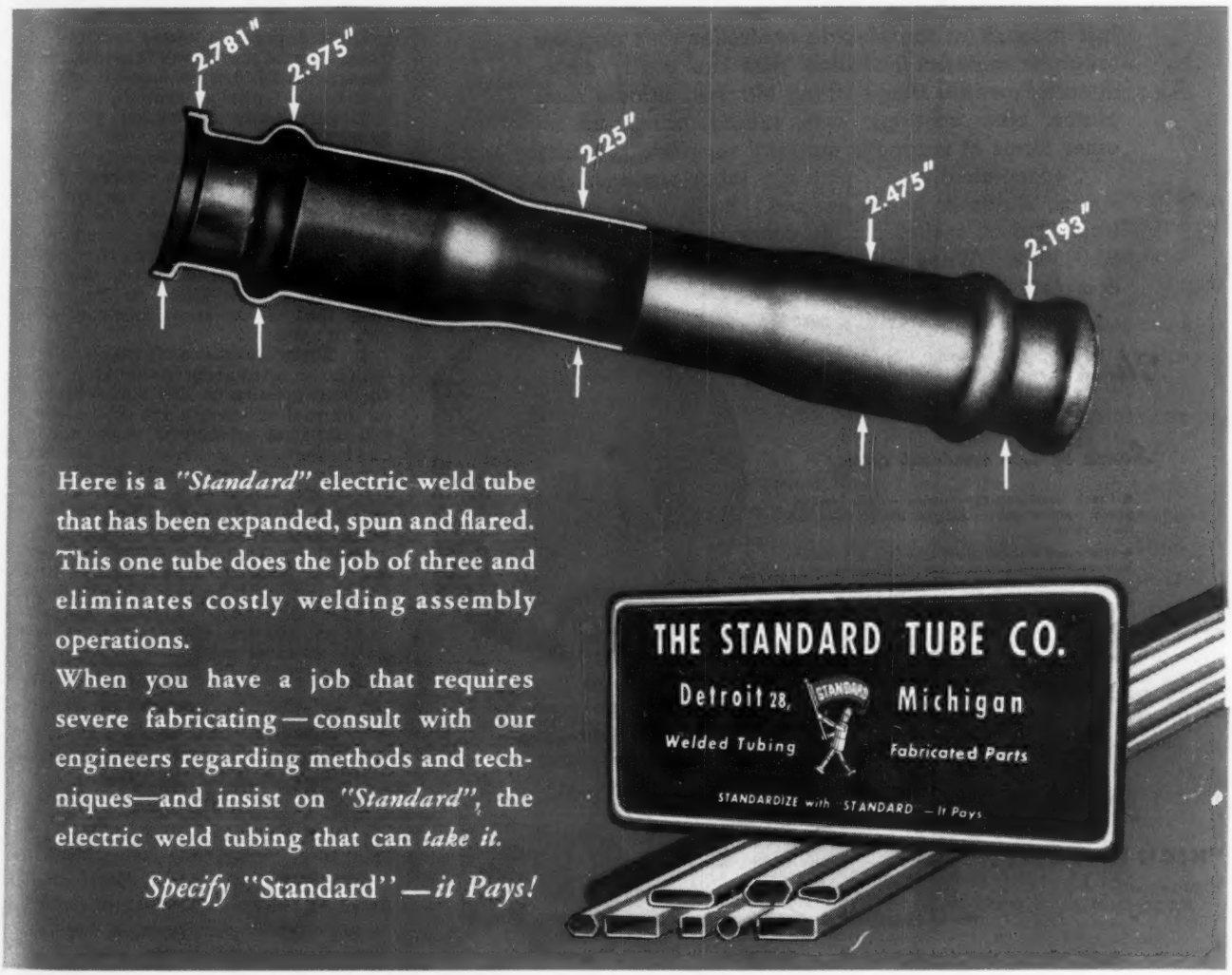
Although nothing abnormal about roof wear had been noted for the test furnaces, it was recognized that the behavior might be different for a furnace on which oxygen was used for every heat. A furnace of 600 square feet hearth area, tapping about 135 tons, and completely rebuilt with basic ends, prior to the start of the oxygen campaign was selected. Operation was with a minimum of special supervision; this was for the purpose of arriving at an estimate of what might be expected reasonably under routine conditions. In all, over 300 heats were made; for 177 of these, the fuel was oil, and oxygen was used on 149 of the 177 heats. (Either mixed gas or mixed gas and oil were used on the others; of these, oxygen was used on 96.) Fuel flow was at a rate of about 400 gallons per hour and oxygen enrichment was to 25 per cent. Hot metal in the charge was about 50 per cent.

No definite effect of oxygen enrichment was found. The roof was first patched after 119 heats and again after 195 heats. In terms of one 13.5-inch roof, knuckle to

"Standard" Tubing Techniques

ONE PIECE of TUBING WITH FIVE DIAMETERS

. . . fabricated by "STANDARD"



Here is a *"Standard"* electric weld tube that has been expanded, spun and flared. This one tube does the job of three and eliminates costly welding assembly operations.

When you have a job that requires severe fabricating—consult with our engineers regarding methods and techniques—and insist on *"Standard"*, the electric weld tubing that can *take it.*

Specify "Standard"—*it Pays!*

DINGS
High Intensity
LIFTING MAGNETS

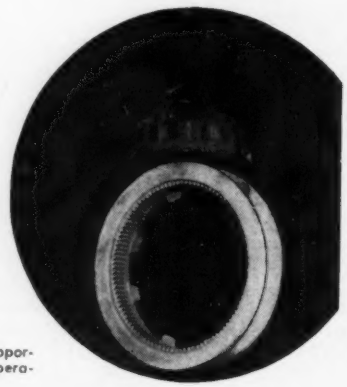
HARD-TO-HANDLE MATERIALS ARE NO PROBLEM WITH THESE MAGNETS

Just a touch of the electric controller . . . and the toughest material handling jobs are easily expedited. *Powerful* Dings Lifting Magnets handle steel plates, bars, castings, rods, tubing, wire and all other forms of magnetic material rapidly . . . easily . . . economically . . . with big labor savings. No straps, slings or hooks needed. Built in diameters from 8 to 65 inches . . . to carry loads from 50 to 65,000 lbs. Write for catalog No. 220 which gives complete data.

They Stay Stronger . . . Longer

Some of the reasons why:

- **Shock absorbing construction**—Coils kept in place despite abuse. Ribbed design used for tough service.
- **Water and weather-proofing**—Coils are vacuum-impregnated and sealed in watertight casing.
- **Long trouble-free life**—Engineered and built for toughest service.
- **Balanced magnetic circuit**—Copper wire and steel proportioned to give maximum lifting capacity with lowest temperature rise.



An eight-foot diameter casting just out of the foundry flask is swung away and stacked easily with a Dings Lifting Magnet.

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"HIGH INTENSITY" Dings

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knuckle, exclusive of skewbacks, the life was 177 heats. Nothing unusual was observed about refractories on any of the oxygen furnaces.

In all, more than 400 oxygen enriched heats were made in five different furnaces which ranged from older types in congested shops to newer designs in modern shops. Charges covered the range likely to be encountered; i. e., from all-cold charge to over 60 per cent hot metal. Information obtained on some items was necessarily incomplete; for example, it was not proved conclusively whether or not oxygen has an effect on furnace life, although indications were that any such effect at least is not harmful. Further, it is clear that the production of an all-oxygen shop would not necessarily be the rate for one furnace multiplied by the number of furnaces; however, before expanding this statement, it may be well to record several so-far unmentioned, or casually mentioned, observations.

1. A furnace "set" for 1 to 3 per cent oxygen in the waste gas remains set upon enrichment of the combustion air.
2. Oxygen - enriched furnaces equipped with waste-heat boilers produce less steam. The certain cause is the smaller volume of waste gas, owing to the smaller fraction of nitrogen; a possible cause is more efficient transfer of heat from flame to charge, which leaves less to be carried to the exhaust system.
3. Intimately connected with the foregoing is the fact that, for a given fuel flow, the flame is shorter with enrichment as a consequent of faster combustion. This changes the temperature pattern to the extent that the hottest zone is concentrated to a narrower range, with the result, in large furnaces at least, that the outgoing end is likely to be cooler than that of the same furnace without oxygen.
4. There exists a furnace factor which is intimately associated with thermal efficiency. The items lumped in thermal efficiency are well known, yet at first glance it may not be clear that, in general, *as inherent furnace efficiency increases, the potential gain from oxygen enrichment necessarily decreases.* Thus, rate of production with oxygen might be increased by as much as 50 per cent with one type of furnace and as little as 10 per cent or less with another, despite constancy of items such as type of charge, charging time, and grade of steel made.

Much more is involved than supplying an adequate amount of oxygen, assuming that an existing shop is being considered for conversion. If the potential gain—whatever it might be for a given type furnace—is to be achieved, there must be no charging delay, and especially no scrap charging delay. Each increment of increased production requires a corresponding increase in the number of charging boxes handled per

unit time; ordinarily this means increased probability of delay. From here on, speculation can proceed in either of two directions; viz., on production of the same ingot tonnage with a reduced number of furnaces or on production of increased tonnage. Then, in addition to more charging boxes to be handled per unit time, there are more ladles of hot metal, more molds, etc.

Many an existing shop could not maintain such accelerated tempo. Future shops, of course, could be suitably designed, but such is not a problem of the moment. Restricting consideration to existing shops each type of furnace and each shop evidently must be treated individually. It appears that there is no single answer to the question of how much open hearth production of the country would be increased by the use of combustion oxygen; the amount is seemingly rather less than that which might be assumed by the unsuspecting reader of the popular press.

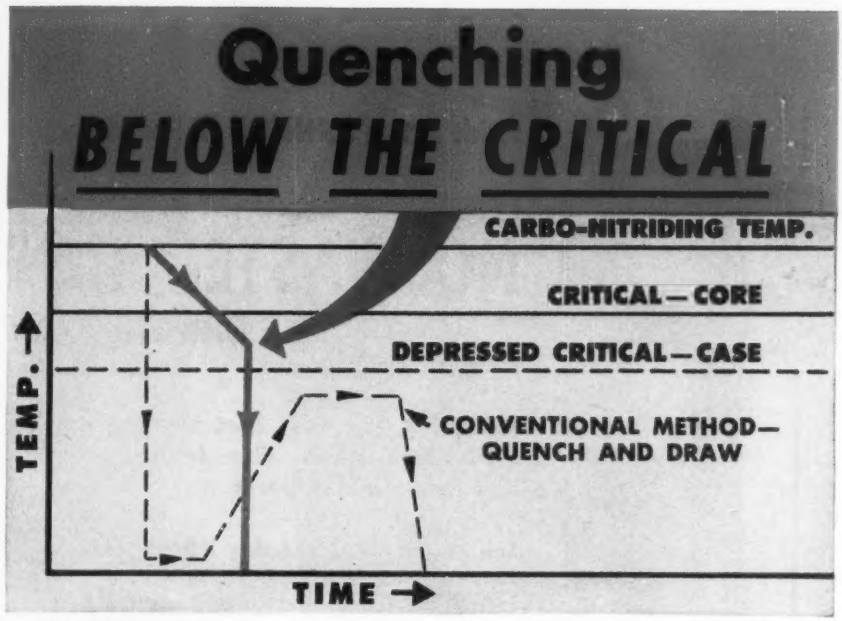
A summation of the foregoing tests follows:

1. In all, more than 400 heats were made with oxygen enrichment, five different furnaces were used.
2. Furnace charges ranged from all-cold to those in which hot metal composed 60 per cent of the total metallic charge.
3. Maximum rate of production was found to result from enrichment to the neighborhood of 27 per cent average oxygen.
4. Oxygen consumption ranged from about 1200 cubic feet per ton for cold charges to about half that for high-metal charges.
5. On specially supervised tests, production increases ranged from 20 to 50 per cent; these were accompanied by fuel savings of 10 per cent to 25 per cent. However, gains were markedly less for unsupervised heats extending over nearly a furnace campaign.
6. Differences of production increase caused by oxygen enrichment are ascribable to furnace and shop factors.
7. It follows from item 6 that each type furnace and each shop must be considered individually.
8. It appears that overall rate of routine production with oxygen would be less than might be indicated by results of tests conducted under special conditions.

From a paper presented at the annual meeting of American Institute of Mechanical Engineers, Pennsylvania Hotel, New York, Feb. 15-19. The experimental oxygen heats were made under joint sponsorship of Bethlehem Steel Co., Air Reduction Co. and Koppers Co.

—o—

Development of an additive to remove all traces of sludge throughout entire fuel system by E. F. Houghton & Co., Philadelphia, eases a long standing maintenance problem. This mixture takes the sludge into solution and makes it a burnable part of the fuel. It is non-corrosive, safe to use and store and is not toxic.



A NEW CASE-HARDENING TECHNIQUE WHICH

- Eliminates the Draw Furnace
- Gives File-Hard Case and Soft, Tough Core
- Cuts Distortion to a New Low
- Saves Time, Money and Floor Space

THIS NEW Holcroft process provides a carbo-nitrided case of superior wear resistance and a soft, tough core of maximum impact resistance—*without a draw.*

The work (plain carbon or alloy steel) is heated in a controlled atmosphere composed of generator gas, hydrocarbon gas and ammonia. Besides increasing the hardness, addition of nitrogen (from the ammonia) depresses the critical temperature of the case below the critical (Ar_1) of the core.

When the desired depth of case is obtained, the work is moved into an atmosphere cooling zone, where it is brought to a temperature *below* the critical of the core and *above* the critical of the case. The work is then quenched from this temperature, as illustrated.

Since the core is quenched below its critical, it undergoes no hardening, and distortion is negligible. The case, however, is made file-hard—more wear-resistant than a straight carburized case. Thus a superior quality of work is obtained, at worth-while savings in time, money and floor space.

This is one more example of Holcroft trail-blazing in heat-treat work of all kinds. This leadership in applied metallurgy is one reason why Holcroft furnaces—individually designed for specific applications—provide unsurpassed quality at lower cost in *every* high-production application. We invite your inquiries.

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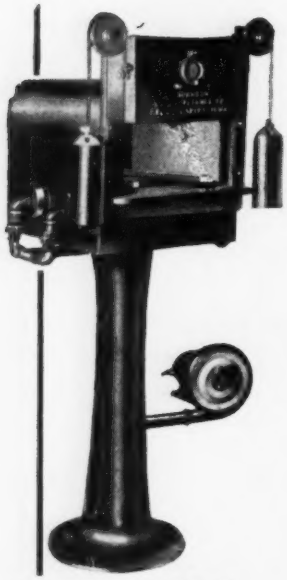

Quick Acting JOHNSON Hi-Speed Furnace

NO WASTED TIME

with No. 130A

For quick, low cost heat treating high speed steels, dies, tools and small metal parts

This powerful *Quick Acting* JOHNSON furnace reaches operating temperature fast to save time and gas. Gets the job done before conventional type furnaces warm up. Use the Four-burner unit for steels requiring temperatures from 1400 to 2350° F., or the Six-burner for 1800 to 2400° F. Burners fire under hearth to assure high uniform heat. Temperatures easily regulated with accuracy. Counterbalanced door opens upwards. Firebox 7¾ x 13 x 16½. Complete, ready for action with Carbofrax Hearth, G.E. Motor, and Johnson Blower.

4-BURNER $295.00
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ORDER TODAY

New JOHNSON No. 1019

METAL MELTING FURNACE

• Fast • Efficient

This furnace is designed for melting large quantities of lead, tin, zinc, pot metal, type metal and other low or medium fusion metals and alloys. The JOHNSON No. 1019 features 9 special type JOHNSON burners, each equipped with separate valve and pilot light. It has a capacity of 1000 lbs. lead and delivers pot temperatures up to 1400°F. without a blower. Heavy insulation reduces heat loss. Removable cast iron pot with lifting hooks is standard equipment. Automatic temperature controls available at extra cost.

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Fully illustrated JOHNSON Catalog describes all cost-cutting, time-saving JOHNSON Furnaces for pot hardening, melting, annealing, heat treating. Industrial gas burners and appliances for every purpose. Write for Free copy.

JOHNSON GAS APPLIANCE COMPANY

573 E AVENUE N.W., CEDAR RAPIDS, IOWA

Hardness Testing

(*Concluded from Page* 104)

the user who requires consistent physical properties or properties somewhat higher than those guaranteed for the T5 temper.

Procedures at the Phoenix mill were changed to insure a rapid movement of metal from the extrusion presses through the aging operation so that any deviation from standard procedure can be quickly detected and promptly corrected. This alleviates the possibility of filling the mill with material that does not meet the required specifications.

When failure occurs with T5 material, it is usually due to a small portion of the lot being below the required standard while the remaining material is entirely satisfactory. Heretofore, the only alternate the mill had, other than scrapping the entire lot, was to contact the customer for acceptance or rejection.

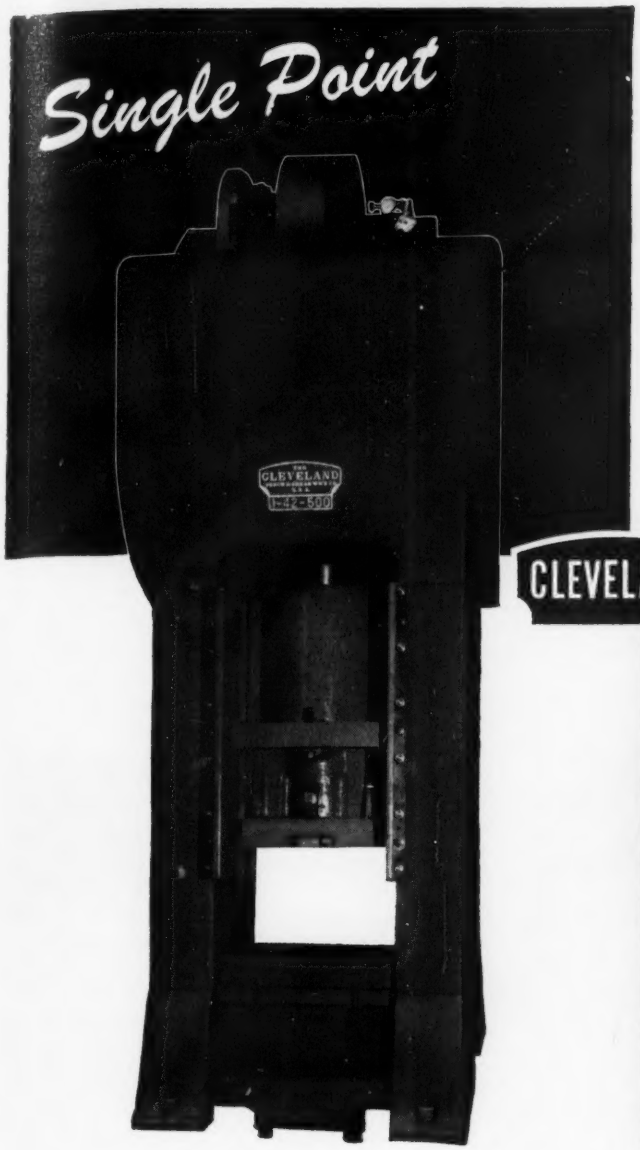
Hardness testing each piece of material in questionable lots reduced the amount of scrap generated, thereby allowing the mill to meet shipping promises and insuring the customer of receiving material of superior quality. Production hardness testing of every lot of suitable material also serves as an additional check on the routine testing of the physical testing laboratory, as substantially more checks can be made with a minimum of cost and time.

Introduction of production hardness testing has not replaced any function or responsibility of the physical testing laboratory. Instead, it is used under the direction of and in conjunction with the laboratory.

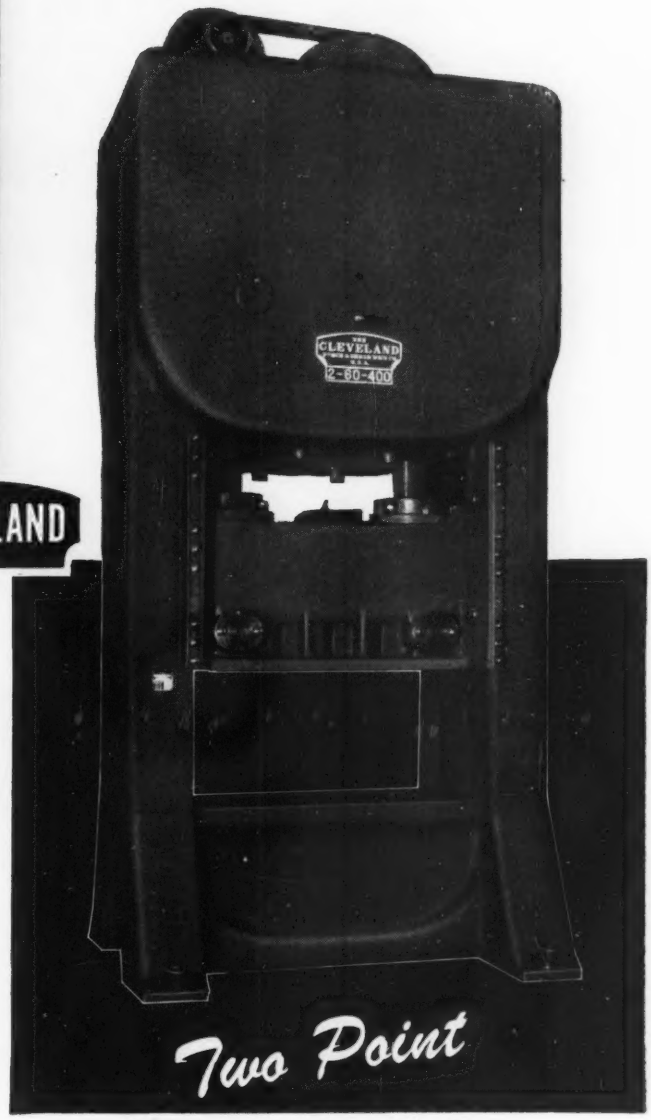
In addition to the above advantages the mill has an additional and very important use for hardness testing. This is in the segregation of mixed scrap, a mill term denoting material that consists of more than one alloy. When a bin of scrap is suspected of being mixed, it is only a matter of minutes until it is possible to obtain an accurate classification.

—o—

Advances in dry cell industry are incorporated in fifth edition of American Standard Specification for Dry Cells available from National Bureau of Standards, Washington. Small sizes of dry cells including flat or miniature cells receive more emphasis than in previous editions. Also included are specifications for radio-battery packs combining low voltage for A circuit and a higher voltage battery for B circuit, a more complete standardization for hearing aid batteries and standardized socket connections for radio A, B and C batteries.



Cleveland Single Point Press, stroke 14", adjustment 6", shut height 25½", bed area 48" x 42", capacity 500 tons.



Cleveland Two Point Press, stroke 20", adjustment 6", shut height 30", bed area 42" x 60", capacity 400 tons.

The Presses illustrated above, which are typical of the Cleveland line of Single and Two Point Presses, and embody every modern improvement, were designed to meet the demand of Pressed Metal Manufacturers for Mechanical Power Presses having greater precision and strength than the conventional Straight Sided Single and Double Crank Presses. The rugged, compact construction of the Cleveland Presses assures long life and low upkeep, while the features incorporated in their design provide faster, better and more accurate production without interruption.

If you are interested in Single Point, Two Point (or Four Point) Presses, we offer you competent engineering service in the selection of the most suitable type and size for your particular requirements.

DRUM-TYPE CLUTCH

With this new Cleveland air operated Drum Type Friction Clutch, with spring loaded brake, you are always assured of *full* clutch or *full* brake, never half clutch and half brake. Furthermore, as there is complete disengagement of all idle friction surfaces, there is no drag or unnecessary wear on the linings, a feature which eliminates heat and assures longer friction "life". If interested we will be glad to mail you a copy of our Drum Type Clutch folder, on request.

THE CLEVELAND PUNCH and SHEAR WORKS COMPANY

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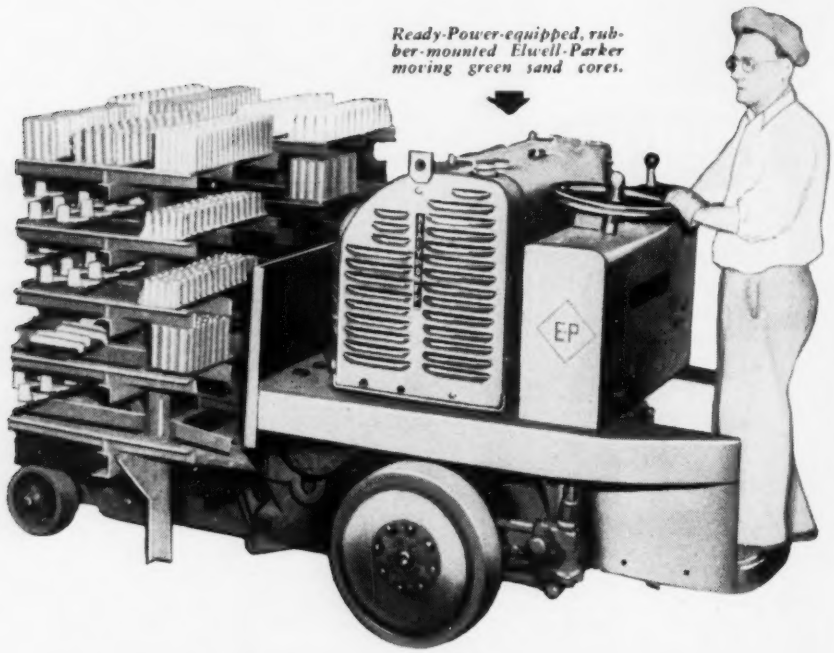
READY-POWER for smooth operation



Ready-Power-equipped, rubber-mounted Elwell-Parker moving green sand cores.

If it's smooth, electric truck operation you want, there's nothing better than Ready-Power gas-electric Power Units. Ready-Power offers *more* than regular electric truck operation because dependable electric current is generated right on the truck chassis in unlimited amounts. That means trucks are always ready to operate at top efficiency . . . 'round the clock if necessary. Install Ready-Power Units on any make electric truck. Write for details.

Ready-Power-equipped Mercury truck loading an annealing oven.

THE READY-POWER CO.

3824 Grand River Ave., Detroit 8, Michigan

Spectrographic Analysis

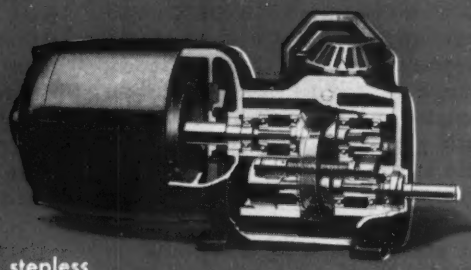
(*Continued from Page* 109)

uct regarding residual elements, the company has built and equipped a spectrographic laboratory especially designed for steel and related product analysis; no attempt was made to fit it into any of the pre-existing laboratory facilities. The building is a 1-story structure of reinforced concrete construction, built as an annex to the main chemical laboratory. All window areas are of glass block construction to prevent the infiltration of dust and smoke. Floor area is approximately 2050 square feet, and is divided into ten rooms. All construction is fireproof and the partition walls are made of 4-inch galvanized I-beams, heavy metal lath and plaster. All metal lath is electrically grounded in order to eliminate any radio interference in nearby areas, which is caused by the high frequency generated by the source unit. With the exception of the shop, storeroom and air-conditioning room, all wall surfaces and ceilings are finished with glazed ceramic tile and plant or acoustic tile. A shop equipped with drill presses, metal cutting saw, shot blast cleaner, lathe, and experimental heat treating furnaces, occupies a portion of the building. It is used for the preparation of samples and general laboratory maintenance. Test samples from the open hearth are delivered to the spectrographic laboratory, by a 2-way pneumatic tube system, approximately 1000 feet long, in 15 seconds.

Littrow Type Spectrograph

The spectrograph is of the Littrow type and has a high dispersion, which is essential in steel analysis on account of the large number of lines in the iron spectrum. It was remodeled according to plans developed by the Bethlehem Pacific Research Department, which makes possible the incorporation of several automatic and time-saving features. Some of these features are as follows: Automatic shifting of the quartz prism from one spectrum region (wave-length 2200/2800 Angstrom units) to another (wave length 2720/4200 Angstrom units) by a pneumatic system, automatic focusing in each region, solenoid control of shutter, automatic racking of plate after each exposure, and automatic timing of operations. These automatic features are electrically interconnected to provide a continuous sequence of operations which requires no attention from the operator.

The excitation source unit will provide either a high voltage interrupted



On thousands of applications in every field of manufacture, stepless variable speed operation assures exactly the right speed for every operation . . . for every operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation pays off in higher rates of production, a more uniform better quality product and more efficient performance of your equipment and your operators.

Master Speedrangers provide this infinitely variable speed in a compact, all-metal, mechanical variable speed unit. And nowhere else will you find units that are so flexible, so easily adaptable and in such wide range of sizes.

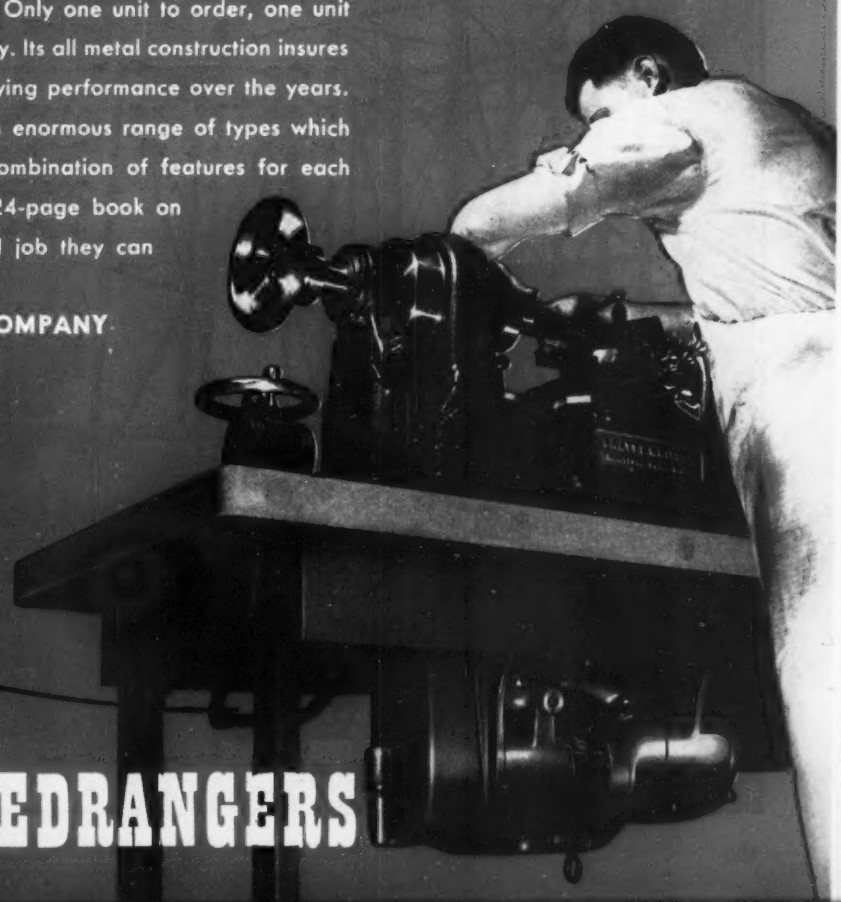
variable speed operation doesn't cost

IT PAYS

For example on this bench lathe, Master Speedrangers are supplied for ceiling mounting with mechanical remote control of the speed changing mechanism. This steel on steel, mechanical variable speed drive is built into an integral construction with the motor to form an extremely compact power package. Only one unit to order, one unit to install . . . saves time, space, money. Its all metal construction insures long, trouble-free service and unvarying performance over the years.

Speedrangers are available in an enormous range of types which makes it easy to select the right combination of features for each job. Write for Data 7525, a new 24-page book on Speedrangers, and see what a real job they can do for you.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO



MASTER SPEEDRANGERS

spark or a high voltage alternating-current arc. The spark circuit consists of a 33,000-volt, 15-kilovolt ampere transformer which charges a series of condensers (condenser capacity can be varied in steps of 0.001-microfarads from 0.001 to 0.021-microfarads) and is then discharged through a rotating synchronous interrupter, resistance, inductance and spark gap. Both inductance, capacitance and resistance can be varied to make possible a change in frequency and temperature of the discharge. The arc circuit uses either 2200 or a 4400 volt, 10 kilovolt transformer. A resistance of approximately 3000 ohms is in series with the arc gap to provide a current of 2.0 amperes through the gap. All doors to any part of the source unit are equipped with automatic switches which breaks the electrical circuit if they are open, providing protection from any high-voltage wiring.

Light from the spark or arc discharge passes into the spectrograph where it is broken up into its respective wave lengths and a portion of the spectrum thus formed is photographed on a plate. Each spectrum appears in two different densities which is obtained by covering the spectrographic slit with a neutral filter, one-half of which allows only 35 per cent of the light to pass through. This permits the reading of lines that are too dark to read on the fully exposed plate to be read on the filtered section. The photographic plate is developed in a machine designed by the research department. It is equipped with automatic temperature control and has 2-direction agitation operating out of step and with different oscillating periods. A plate is completely processed, washed and dried in approximately 5 minutes.

Determining Concentration

To determine the concentration of a given element it is necessary to measure the density of certain selected spectral lines. This is done on a microphotometer of the Vincent and Sawyer type. The characteristic curve for each plate is plotted and from this curve the logarithmic ratio intensity of the element line and an iron reference line is calculated by their respective densities obtained when read on the microphotometer. By referring these values to an analytical scale board the percentage of each element is determined. It is essential to have constant voltage current to operate the microphotometer and this is accomplished by having two sets of wet storage batteries. While one set of batteries is being used the other set is charged, and this is accomplished automatically every 8 hours by an electric timer and suitable relays.

The laboratory is completely air-conditioned to provide uniform conditions of temperature and humidity. All air is electrostatically cleaned to remove dust and smoke.

Operators of the spectrographic equipment are the regular shift chemists who have been given a specialized training course to acquaint them with the operation.

In order to centralize all steel analysis operations, a chemical laboratory has been incorporated with the spectrographic installation for the analysis of carbon, phosphorous and sulphur, as these particular elements are determined more satisfactorily chemically than spectrographically.

With this new equipment the analytical results can be obtained in minutes instead of hours, which makes possible the determination of the composition of the steel in the furnace at all times. If residual elements are found in quantities that would prevent the manufacture of quality steels, the heat will be diverted into a product where these elements will do the least harm.

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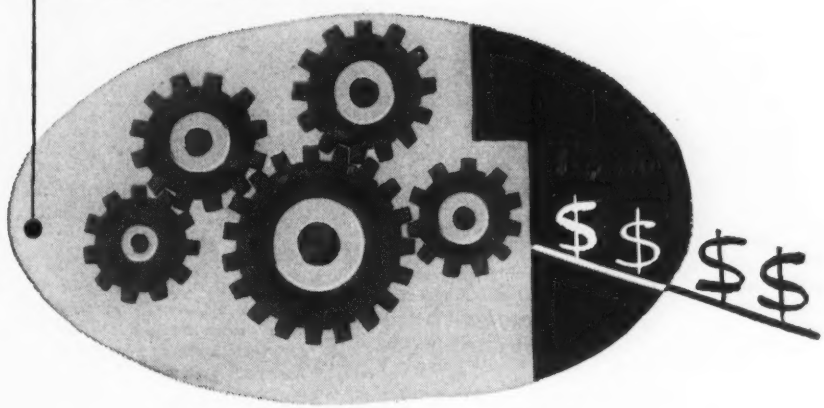
Link three names together—Steel, AVONDALE, and Oil . . . and you have forged a chain of industrial progress. Steel is the material from which AVONDALE makes tools for the Oil Industry.
Pipe jackets for constructing Oil Well Drilling platforms in the Marine Fields off Louisiana. Designed by J. Ray McDermott & Co., Inc.
STEEL
AVONDALE MARINE WAYS, INC.

WANTED CORPORATION PRESIDENTS

to start the machine that manufactures SECURITY



This machine operates best when started by top management! It's the ***Payroll Savings Plan*** for the regular purchase of U. S. Security Bonds. It produces security for individuals, for business, and for the nation at large.

Security for individuals . . . because every $3 invested in Security Bonds pay $4 at maturity.

Security for business . . . because the billions of dollars already invested—and being invested—in Bonds are building future purchasing power.

Security for the nation . . . because every Bond dollar that is built up in the Treasury is used to retire a dollar of the national debt that is potentially inflationary, and because every Bond held means fewer dollars to go to market to bid up prices on scarce goods.

Produces Other Benefits, Too!

In 19,000 industrial concerns operating the Payroll Savings Plan, employees are more contented. Worker production has increased, absenteeism has decreased—even accidents have been fewer!

Why Should Top Management "Press the Button"?

Begun in war-time, the Payroll Savings Plan was rapidly and widely adopted under the stimulus of dramatic patriotic appeals.

Those appeals are gone. Yet the reasons for investing in Security Bonds today are important. Management men can understand these reasons—and have the influential authority that's needed to "start the machine". . . to get the Plan vigorously promoted.

Your Task Is Easy—and Vital!

To enable you to install or to reinvigorate the Plan in your company, with minimum time and effort, the Treasury Department has prepared a kit of materials especially for you to distribute among specific key personnel. Be sure to get and use your kit! Your sponsorship of the Plan will bring you its greatest benefits in your own company—and you'll be doing your part to help guarantee America's security—***which is your best business security.*** For help, call your Treasury Department's State Director, Savings Bonds Division.

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and the Advertising Council.

Only Binks Dynaprecipitor water-wash spray booths

GIVE YOU ALL THESE ADVANTAGES

J. J. Roche
President

No other spray booth gives you the high efficiency and low cost operation to be found in a Binks Dynaprecipitor unit. There are 148 standard sizes from which to choose. "Engineered" booths are available in any size or shape.

The use of a Binks Dynaprecipitor unit reduces fire and explosion hazards by removing all overspray from the room. The finishing department stays cleaner and more healthful — a pleasanter place in which to work.

Exhaust air washed 5 times: The paint and fume-laden air passes through 5 thorough washings before it is vented. See 5 stars (★) on Figure 1. Paint pigment is collected in the Dynaprecipitor. It will not unbalance the fan, or collect in the exhaust ducts or on the exterior of the building.

Dynaprecipitor stays cleaner much longer: All surfaces with which the overspray comes in contact are constantly flushed. Booth cleaning time is minimized.

Unique clog-proof construction: There are no nozzles to clog. The water is distributed directly from the large manifolds by means of deflector plates.

Uniform distribution of large water volume: There are no breaks in the water curtains . . . no gaps in the air-washing spray. There is more water circulated per lineal foot of a Binks Dynaprecipitor than any other booth.

Efficient paint reclamation: This unit washes out and collects an exceptionally high percentage of the overspray for reclamation. Heavy solids and light pigments collect in the fore part of the pan and are prevented by a divider in the pan from recirculation through the system.

Manifolds constantly flushed: The water constantly circulates through the manifolds to prevent settlement of sediment. This is illustrated in Figure 2.

Water economy: The water is circulated over and over again. Moisture eliminators remove all of the water from the air before it is vented.

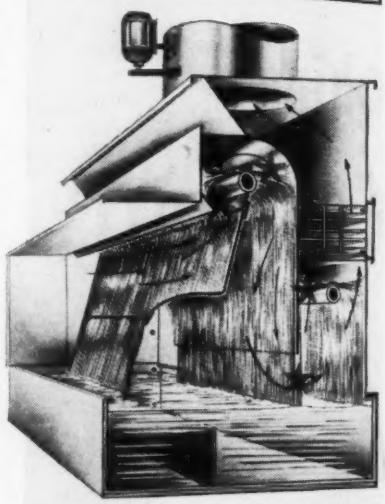


FIG. 1
Diagram showing passage of air through a Binks Dynaprecipitor water wash spray booth. Stars (★) mark 5 places where the exhaust air is washed.

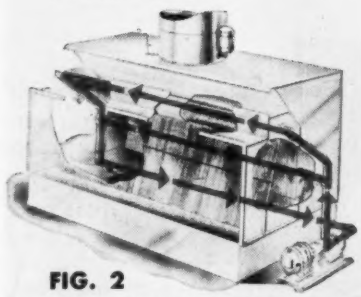


FIG. 2
Diagram showing the water circulating system.

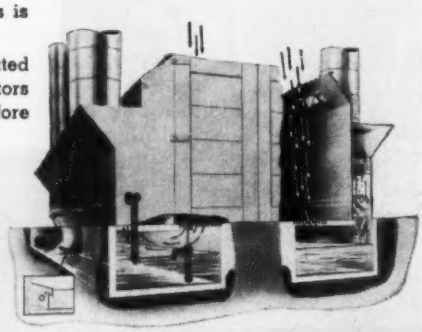


FIG. 3
Diagram of a Binks down-draft Dynaprecipitor unit, showing the flexibility of the Dynaprecipitor principle. In this booth the air is vented through grills in the floor. This layout is ideal for use with heavy products such as automobiles, railway cars, etc.

Binks *Send now* for your free copy of our new Catalog-Data Book.

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Endwelded Studs Reduce Sheetmetal Roofing Costs

Corrugated sheetmetal application costs are being cut by Nick & Hendon, roofing contractors, on a factory building now being erected in Birmingham, Ala. A new shoulder type rivet stud with a flux filled base developed by Nelson Stud Welding Corp., Lorain, O., eliminates the need for holding straps and inside scaffolding thus speeding the roofing.

Studs are located by means of a lightweight template and electrically endwelded to the steel purlin. Corrugated metal sheets are then laid in position on top of studs and impaled over piercing sections of studs with a rubber hammer. Final operation is the upsetting of rivet to secure the sheet.

Roll Spot Welder Joins Small Parts

Spot welds at the rate of 1440 per minute are used at Ward Machine Co. Inc., Brockton, Mass., to weld together the blade and leg of a vest pocket dry shave razor. Blade which is ⅛-inch wide is of hardened and tempered steel and the leg is of mild steel. The two parts have a T-shaped cross section when joined and the job is done in 1/10 of a second with 9 welds per inch.

Method and equipment used in doing the job were worked out by the company in co-operation with a field engineer from Progressive Welder Co., Detroit. The miniature roll spot welder which does the job without affecting temper of blade was built in the company's plant.

Cannisters For Bulbs

Latest use for steel-and-tin cans is in the form of containers to protect air shipped photoflash bulbs from premature ignition by radar waves. Cannisters are result of extensive research done by Wabash Photolamp Division of Sylvania Electric Products Inc., New York. Each container is said to deflect even the most powerful radar waves at close proximity while lip type cover will not open even under adverse conditions of transportation and handling.

—o—

Nearing completion is the Manual on Fatigue Testing which is being prepared by the committee on fatigue of American Society for Testing Materials, Philadelphia. Most of the manual has been completed and reviewed and remaining two sections were discussed and final revisions were made during a recent meeting.

Chrome Base Concrete Developed for Furnaces

Chrome-base concrete developed by Babcock & Wilcox Co., New York, for industrial furnaces makes available for the first time an easily installed concrete combining refractory and slag-resisting properties of chrome-base materials with the ability to support loads at temperatures up to 3100°F. It can be poured like ordinary concrete, applied by plastering, or put on with a cement gun.

According to the company the product, called Kromecast, cuts down construction time, reduces furnace maintenance and contributes to longer sustained operating periods. Possible applications include: Furnace walls, hearths and floors in metal heating and forging furnaces, electric furnace roofs and water cooled boiler furnaces operating at high temperatures.

Spiral Bent Bars Give Added Strength

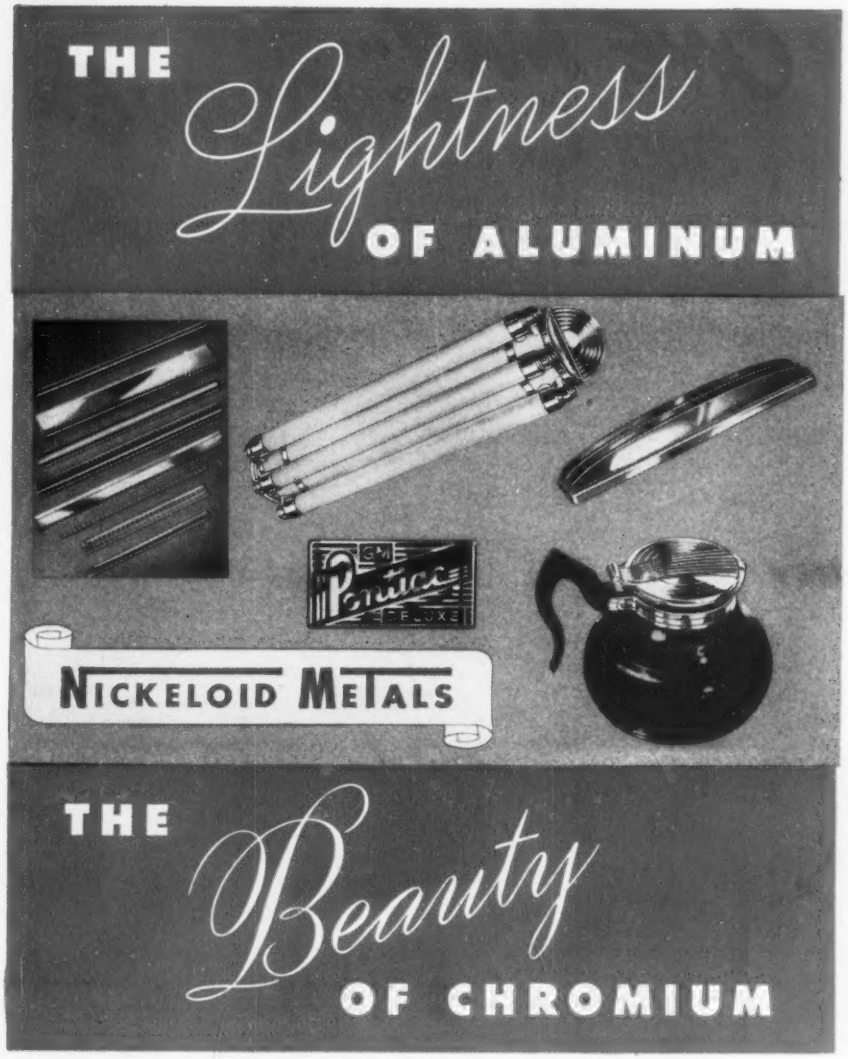
Production of a reinforcing bar for concrete in a deformed dumbell shape by Webrib Steel Corp., New York, raises the yield point of ordinary intermediate grade steel from a specified value of 40,000 pounds per square inch to a minimum value of 60,000 pounds per square inch. Considerable savings are made possible in amount of steel required in reinforced concrete construction.

High bond strength inherent in the shape of spiral bent bar is further increased by presence of transverse ribs. Height and space of ribs are calculated to balance their capacity in bearing on concrete with the shearing strength of concrete between the ribs. Cold spiral bending and twisting also individually tests each bar as the process reveals hidden defects such as piping, seams and laps, all of which are causes for rejection.

Pressure Molded Parts Find Wide Application

Aluminum base alloy pressure molded parts now being manufactured by Lukens Aluminum Corp., Dayton, O., afford the product designer greater latitude in designing parts than was possible in the past. Properties of pressure moldings make it possible for designer to secure in one casting a combination of the desirable properties of die castings, forgings and heat treated permanent molded castings.

Pressure molding machines used by the company were designed by R.



Chrome Plated Aluminum Sheet

Chrome and Nickel Plated Aluminum sheets are again available after a seven-year wartime absence. American Nickeloid Company *exclusively* offers these useful, durable metal sheets at an amazingly low price. The addition of the nickel or chromium coating makes the aluminum base more durable — mirror-like in finish. Chrome and Nickel Aluminum are rust-proof, highly resistant to corrosion, can be easily soldered, stamped, or formed. Available in sheets up to 36" x 96", bright or satin finish, wide range of gauges and tempers. Write today for more data.

Free New Booklet Tells **USES for NICKELOID METALS**

This colorful illustrated booklet tells many of the ingenious ways in which manufacturers are using Nickeloid Metals to improve the appearance and marketability of their products. Write for it on your company letterhead.

50 Years of Pre-plated Metal Leadership

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ONE MAN... and ONE ENGINE-

may solve your materials handling job!

Conservation of manpower—an important factor in increasing production and lowering cost—is a major economy in the use of OSGOOD MOBILCRANES.

The power and fast, precise maneuverability of the OSGOOD MOBILCRANE finds almost limitless application in every type of industry and plant requiring the handling of bulky or heavy materials. MOBILCRANES can get in and out of the tight spots without difficulty—require no tracks or special roadways—pneumatic-tired wheels are easy on floors, too.

MOBILCRANE efficiency in your plant and yard operations can mean substantial savings for you in time, manpower, cost and maintenance. Write today for complete information and specifications.

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DIESEL, GASOLINE OR ELECTRIC POWERED • ⅜ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES

E. Lukens and built by Central Tool & Die Co., Dayton. Aluminum base alloy pressure moldings are already being used in a variety of applications including automotive, gasoline engine and aircraft industries.

Arc Welded Steel Uses Described in Design Film

Produced to assist the designer and engineer in using arc-welded steel in designing all types of machinery is a movie recently released by Lincoln Electric Co., Cleveland. Based on experience machinery manufacturers have had in using welded steel fabrication, the 16 mm movie gives examples of four fundamental elements in all machinery: Bases, wheels, containers and covers.

Animated comparisons of various materials are made in the film, and a study of load factors, stresses, rigidity, performance and appearance is presented. An explanation is given of how welded design permits freedom of planning, speeds up fabrication, reduces weight and permits greater strength from less material.

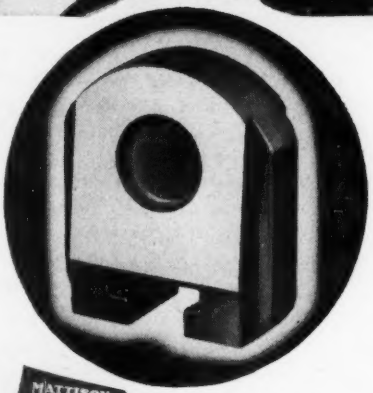
New Concentrator Cleans Coal and Ore

Cleaning of coal, ores and similar materials by the heavy-media method of separation and removing rejects is possible with a new float sink concentrator made by Link-Belt Co., Chicago. The separating medium employed in cleaning coal is composed of a mixture of water and finely ground magnetite proportioned to give desired separating gravity.

Concentrator consists essentially of a drum-shaped tank to contain the liquid medium and a rotating elevator with perforated lifter shelves that deliver sink material to a flume. Practically all of the medium is recovered through a stationary sieve, passed to a sump and re-circulated through a pump to the concentrator.

—o—

Details of a 7-day training course in statistical quality control designed for instruction of managerial personnel in manufacturing firms are available in a manual recently released by Office of Technical Services, Department of Commerce, Washington. Manual was prepared in 1944 by statisticians at Carnegie Institute of Technology, Pittsburgh, for application to war industries. Twelve reports summarizing wartime experiences of representative firms with quality control are included.



Assembled Without Gasket

TO WITHSTAND 600 LB. PRESSURE

Users of Mattison Grinders, having parts which must be assembled without gaskets, are getting results in accuracy and fine finish that eliminate the lapping operation in most cases. One example is the gate valve disc shown in the picture.

They are ground on a real production basis — 100% increase over previous method to a close degree of accuracy and are assembled without the use of gaskets to withstand pressures up to 600 lbs. There is no lapping operation. Material is Exelloy 325 Brinell.

This is only one example showing the capability of the Mattison Grinder. Further examples are shown in the Mattison Set-Up Book.

Write for Free Set-Up Book showing how others have reduced time and cut costs with Mattison Grinders.

MATTISON MACHINE WORKS

ROCKFORD · ILLINOIS

The completely scientific production of HOLTITE screws, bolts and allied fastenings is closely supervised through every operation by our skilled Engineering Staff. From the analysis of raw material to the final hardening, heat-treating and finishing every operation is meticulously checked and inspected by the latest scientific devices. Modern comparators throughout the production line supplement inspection devices to insure absolute precision.

Aided by special research in extensive chemical and metallurgical laboratories, our engineers are constantly improving methods, equipment and products to provide users with the most rugged, uniform and accurate fastenings science can devise.

HOLTITE *Engineered Fastenings* effect tighter, stronger, vibration-defying assemblies with cost-cutting efficiency. Select your next requirements from HOLTITE'S complete line . . . your time study records will prove the wisdom of their continued use.

CONTINENTAL SCREW CO. New Bedford, Mass., U.S.A.

Analyzer Solves Problem By Synthesis

Difficult problems in the field of electrical circuits, machinery, applied mechanics, hydraulics and heat flow can be solved by a calculating machine designed and built by Westinghouse Electric Corp., Pittsburgh. Instead of solving equations according to rules of formal mathematics, essential elements of machine to be analyzed are synthesized from an array of electrical devices such as capacitors, resistors and inductance coils.

Electrical analog of the test machine operates electrically exactly the same as real machine does mechanically. Forces applied to real machine like short circuits, impacts, application of heat or whatever constitutes the actual problem are represented by electrical voltages or currents that can be applied to synthetic machine set up on computer at same places where actual forces occur. Resulting voltages representing forces can be measured accurately at any point by connecting leads of a cathode-ray oscilloscope to analagous parts of synthetic machine. Trace on oscilloscope screen is an exact replica of magnitude and wave shape of corresponding quantity in actual machine.

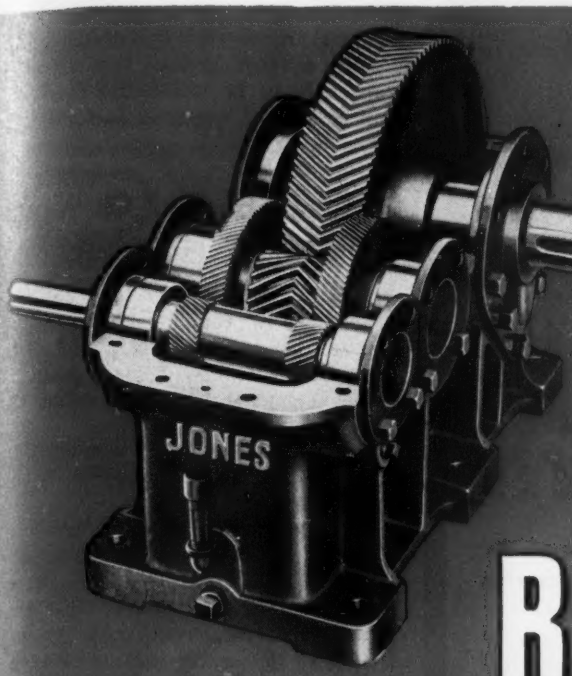
Bibliographies Compiled For Technical Subjects

Formation of a pool of unpublished bibliographies by Special Libraries Association which are housed at Battelle Memorial Institute, Columbus, O., makes many rare and unpublished volumes on scientific and technical subjects available to industry. In each case bibliographies have been compiled by technical librarians who are outstanding literature searchers in their respective fields.

Phases of technology represented by the bibliographies include metallurgy, physics, welding, mechanics, combustion technology and many others. Listings of the bibliographies may be obtained from the institute library from which loans may also be made.

Powder Metallurgy Terms

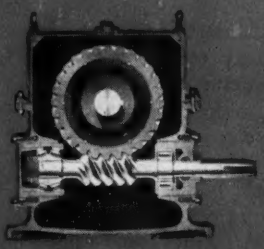
New glossary of terms used in powder metallurgy has been prepared by committee on metal powder and metal powder products of American Society for Testing Materials and will be published soon. Definitions of 130 terms are contained in



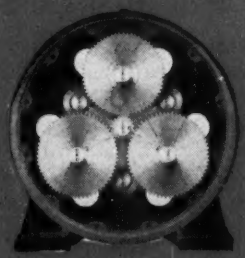
Your kind of...

SPEED REDUCERS

HERRINGBONE REDUCERS
Ratios 1¼ to 1 up to 300 to 1 in capacities from 1 to 400 H.P.



WORM GEAR REDUCERS
Ratios 4 to 1 up to 90 to 1 in capacities from ¼ to 100 H.P.



SPUR GEAR REDUCERS
Ratios 5-1/3 to 1 up to 200 to 1 in capacities from ½ to 75 H.P.

When you want a speed reducer you want the type that will best handle your particular drive problem . . . and you want a reducer that will "stand the gaff." Jones reducers measure up to both of these standards.

It makes no difference whether you require herringbone, spur or worm gear reducers, the Jones organization can give you just what you need in any ratio and capacity . . . and over the years Jones reducers have shown the ability to "take it" under the most severe operating conditions.

Jones offers your kind of speed reducers to solve your kind of drive problems.

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HERRINGBONE — WORM — SPUR — GEAR SPEED REDUCERS
PULLEYS • GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • FLEXIBLE COUPLINGS

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PRODUCTION *Increased TEN-FOLD*

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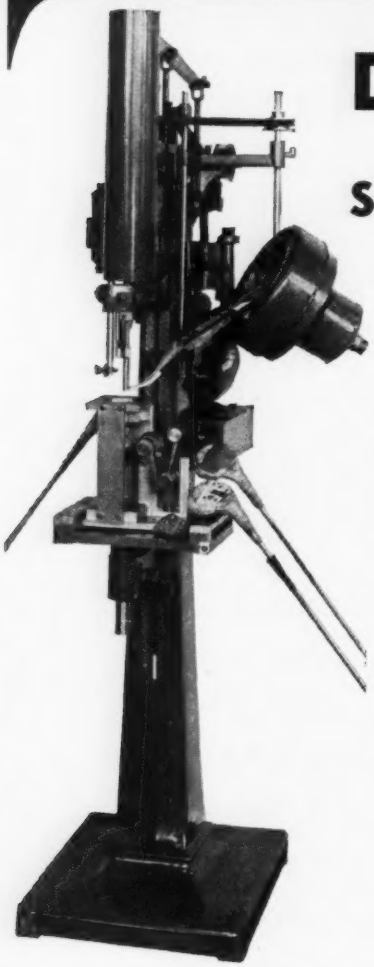
DETROIT *—Power—* SCREWDRIVERS

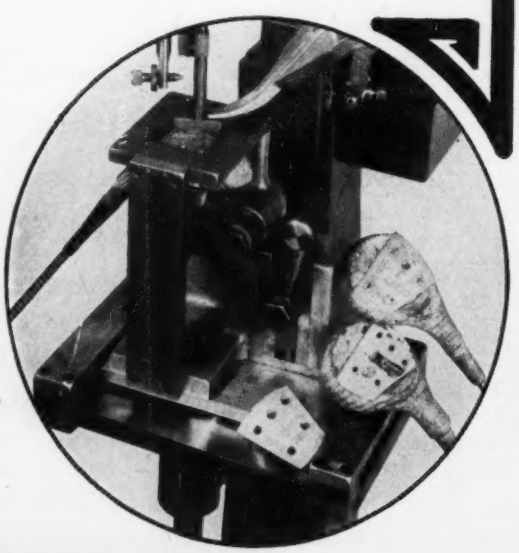


Here is a unique example of the diversified jobs done with amazing speed and ease of operation.

ASSEMBLY OF SOLE PLATES ON GOLF CLUB HEADS

Old Production by Hand, 20 to 25 Assemblies per hour – Possible production with Detroit Power Screwdrivers, 200 to 250 Assemblies per Hour.

The entire club is placed in fixture with Sole plate.—Complete Assembly is locked into place by fast cam action lock —Entire fixture rolling on ball bearing casters.—Indexed by hand to five-hole locations.—Positive positioning made possible by center-locating pin—Screws all driven uniformly without marring heads or stripping.



DETROIT POWER SCREWDRIVER CO.

2811 W. Fort Street
DETROIT 16, MICHIGAN

the glossary. The committee also reports progress on the design of two contemplated tensile test bars applicable to powder metallurgy products, one of which is to be flat and the other machined.

Mill Embossed Aluminum Eliminates Finishing

Embossed aluminum in flat sheet thicknesses ranging from 0.010 to 0.040-inch and in widths from 12 to 48 inches is now being supplied by Reynolds Metal Co., Louisville. Coiled sheet can be furnished in thicknesses between 0.010 and 0.040-inch and in widths ranging from 6 to 36 inches.

Matched roller-die machines emboss patterns in aluminum sheet such as: Squares, diamonds, stucco, simulated grained leather and crosswise and lengthwise ribs. In addition to improving the appearance of sheet and hiding various evidences of rough usage, some patterns have the added advantage of additional strength resulting from the embossing.

Although embossed sheet costs slightly more per pound than plain aluminum sheet, savings in finishing make it attractive economically. Some applications in which material has already proved its worth are: Truck bodies, casings for air conditioners, exposed duct work and electrical fixtures and appliances.

Indiana Chamber Compiles New Industrial Guide

A 1948 industrial directory recently compiled by the Indiana State Chamber of Commerce, is now available from the chamber's headquarters in Indianapolis. It lists manufacturers, processors and wholesalers plus basic data on the state and 689 communities.

Information included covers: Part 1, civic encyclopedia; alphabetical listing by communities; Part II, buyer's guide; classification by products handled. Part III, state-wide index; an alphabetical locator for home and branch offices.

Beryllium Content

Spectrographic analytical method for determining beryllium content of magnesium alloys containing up to 0.1 per cent beryllium, is described in a report available from Office of Technical Services, Department of Commerce, Washington. A full description of the method and procedures developed by materials laboratory, Wright Field, O., including

preparation of standards and electrodes and pertinent tables and graphs are included.

Synthetic Chemical Acts As Corrosion Inhibitor

Synthetic chemical which reacts with metal surfaces by forming an invisible protective film to resist corrosive action of air and moisture was recently developed by Charles Stevens & Co., New York. Designated CS-CI-501, it is a stable compound which slowly vaporizes surrounding ferrous material with a vapor to prevent corrosion.

Even when moisture condenses on a metal surface in very humid atmosphere, corrosion is prevented because the inhibitor in the surrounding air immediately dissolves in the water film to protect metal. Paper impregnated with the chemical is sufficient to protect metal from corrosion in shipment.

Acid Core Solder Makes Better Joints

Acid core solder for use with metals usually considered insolderable such as stainless steel, Monel and nickel was recently developed by Alpha Metals Inc., Brooklyn, N. Y. According to the company, development of the hard acid flux used is the first innovation in the field of acid core solder since 1929.

Synthetic acid used is considerably more active than zinc chloride but is only half as corrosive. It is readily soluble in water and can be washed off easily.

Conference Report

Report of proceedings at technical sessions of Conference on Materials Handling held in Cleveland last January was announced recently by Clapp and Poliak Inc., New York, management of National Materials Handling Exposition which was held concurrently with the conference. Book is believed to be first report of its nature ever published and one of few texts on materials handling problems.

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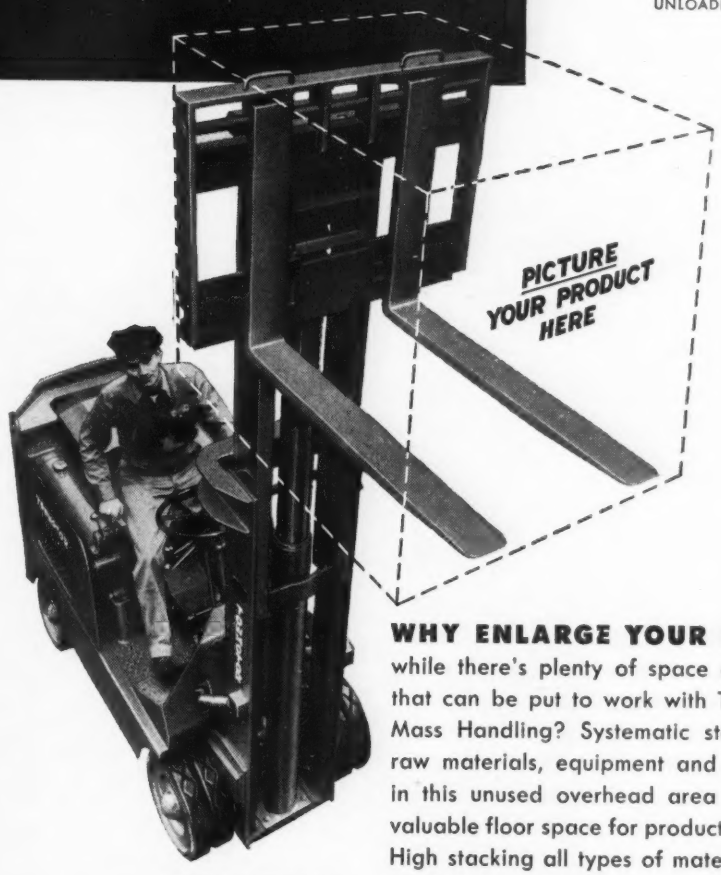
Manual on vibration which presents in logical order all of the formulas found directly useful in structural problems on merchant and naval vessels at David Taylor Model Basin is now available from Office of Technical Services, Department of Commerce, Washington. System of symbols is uniform throughout and all formulas given yield answers in inch pound second units.

You Need MH* to Save Space!

* M H is MASS HANDLING—the systematic movement of the most units, in the shortest time, at the lowest cost.

UNLOADER



SEND FOR FREE BOOK "The Towmotor Fork Lift Truck and Tractor Guide" which describes all Towmotor Standard Products and shows how Towmotor Fork Lift Trucks save space in your plant.

WHY ENLARGE YOUR PLANT while there's plenty of space overhead that can be put to work with Towmotor Mass Handling? Systematic storage of raw materials, equipment and products in this unused overhead area will free valuable floor space for productive work. High stacking all types of materials and products with Towmotor Fork Lift Trucks and Accessories can save space in your plant, expedite handling operations in and out of storage. Check the advantages of Towmotor Mass Handling now.

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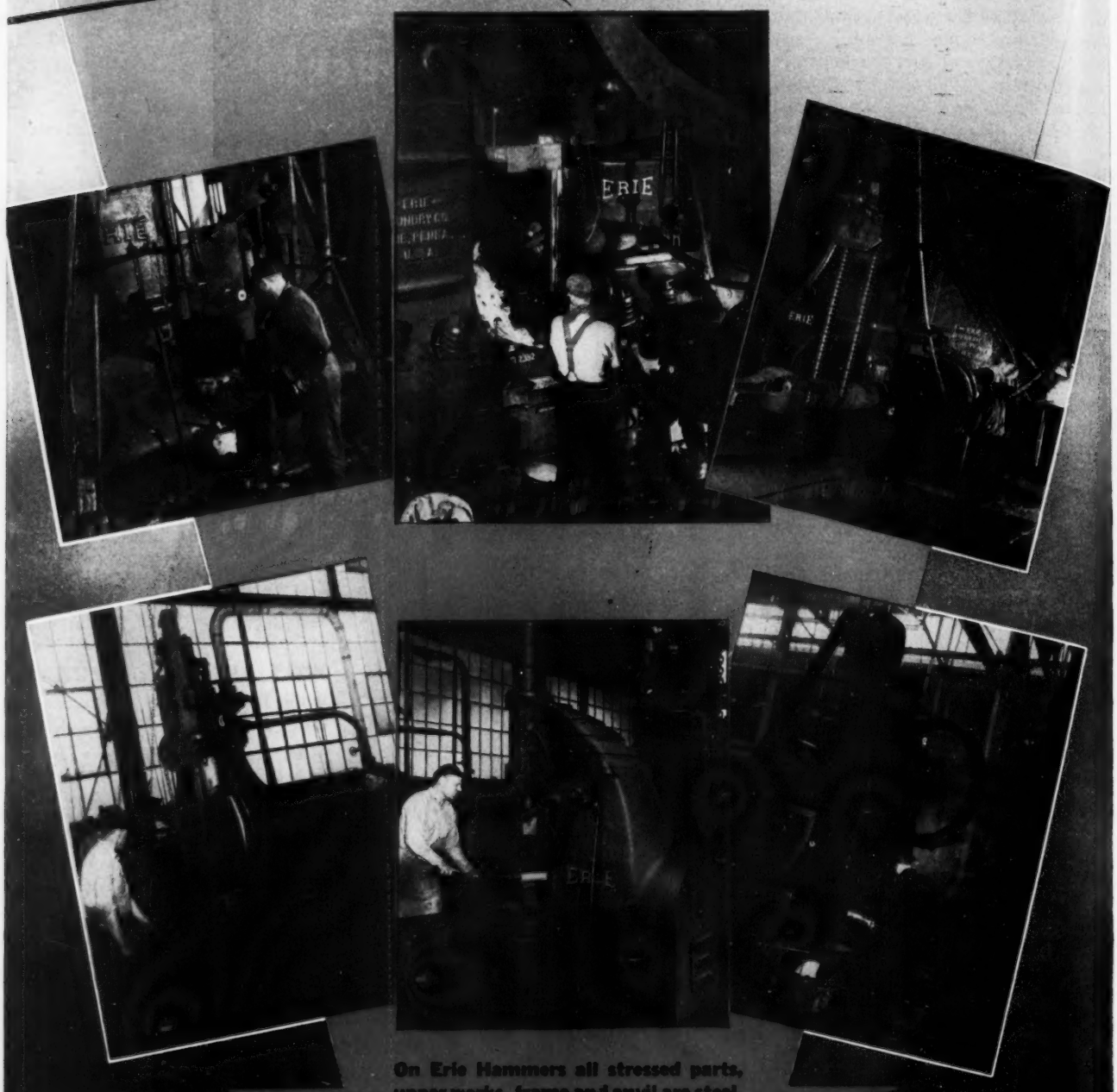
ERIE builds the right hammer for the job . . . Here illustrated *in operation* are Erie Steam, Air, Board Drop and Pneumatic Hammers, Erie Single and Double Frame Forging Hammers, and Erie Trimming Presses . . . products of a half century of hammer design and building "know how". Erie engineers will consult with you on your requirements . . . write us before purchasing equipment for producing modern forgings.



On Erie Hammers all stressed parts, upper works, frame and anvil are steel.

ERIE

Bulletins giving full details on any or all of these Erie products are available to you for the asking.

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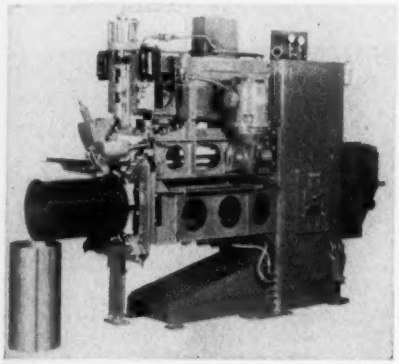
ERIE BUILDS *Dependable* HAMMERS

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 150

1. Seam Welder

An automatic cylinder forming seam welder, developed by Federal Machine & Welder Co., Warren, O., produces welded cylinders from flat steel. Machine, built in several sizes, will process 26 to 16 gage mild steel cylinders ranging from 11 1/4-inches in diameter and 14 inches long to 22 inches in diameter and 37 1/2-

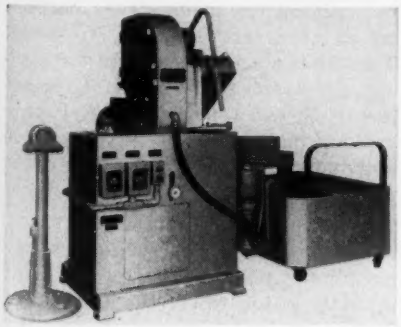


inches long at rates of 600 to 1500 per hour, depending upon length and material thickness.

Machine may be manually or automatically fed. Sheet stock is moved into forming rolls of welder and automatically welded and ejected onto a conveyor or mechanical handling system. An abrasive blast sheet edge cleaner with automatic transfer into welder is designed to become a unit of the machine when processing cylinders from hot rolled or rusty steel.

2. Bar Cutter

Practically all types of materials up to 2 inches in diameter in solid stock and 3 1/2-inches in tubing may be cut with the model 223 hand operated wet abrasive cutting ma-

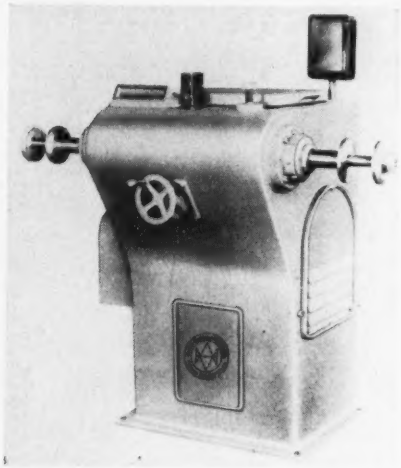


chine, developed by Andrew C. Campbell Division, American Chain & Cable Co. Inc., Bridgeport 8, Conn. Cutter features a 5-inch wheel flange, wheel guides, automatic work stop, automatic coolant pump operation and automatic hydraulic work clamp.

Completely separate, the wheel mounted coolant tank permits easy removal for chip cleaning. Separate compartments settle out sludge and keep coolant cool. Gusher type pump is automatic.

3. Polishing Lathe

Variable speed arrangement through a handwheel permits the user of the type MI and MS polishing lathes, developed by Hanson-Van Winkle-Munning Co., Matawan, N. J., to select any speed between 1800 and



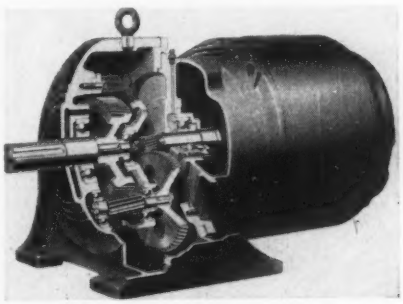
3600 revolutions per minute. Spindle speed is governed by a variable pitch motor pulley and a single, wide V-belt. Calibrated control moves motor and pulley assembly which changes drive centers.

Both types have magnetic starters. Lathe is built into a welded steel base. Spindles turn in pressure lubricated, self aligning bearings. Motor is NEMA standard, ball bearing, open squirrel cage, enclosed and protected by the steel base.

4. Gearmotors

Gearmotors in six basic sizes or diameters capable of delivering from 1 to 60 horsepower and available in single, double and triple reduction units in each size, are announced jointly by Reliance Electric & Engineering Co., Cleveland and Philadelphia Gear Works Inc., Philadelphia. Helical type horizontal units are complete integral alternating or direct current motors with flange mounting and operate in a speed range of from 7 1/2 to 780 revolutions per minute.

NEMA "D" type flange mounting

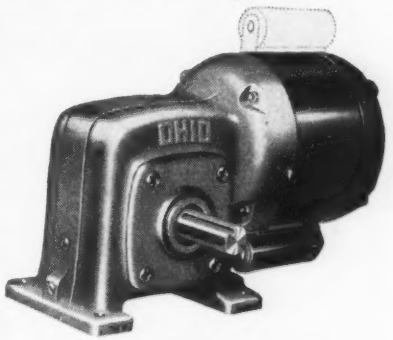


permits use of any type enclosure in alternating or direct current motors. Motor and gear units, each self contained, may be inspected without uncoupling from the driven machine. Housings are leak proof and lubrication is by a splash system with a large reservoir.

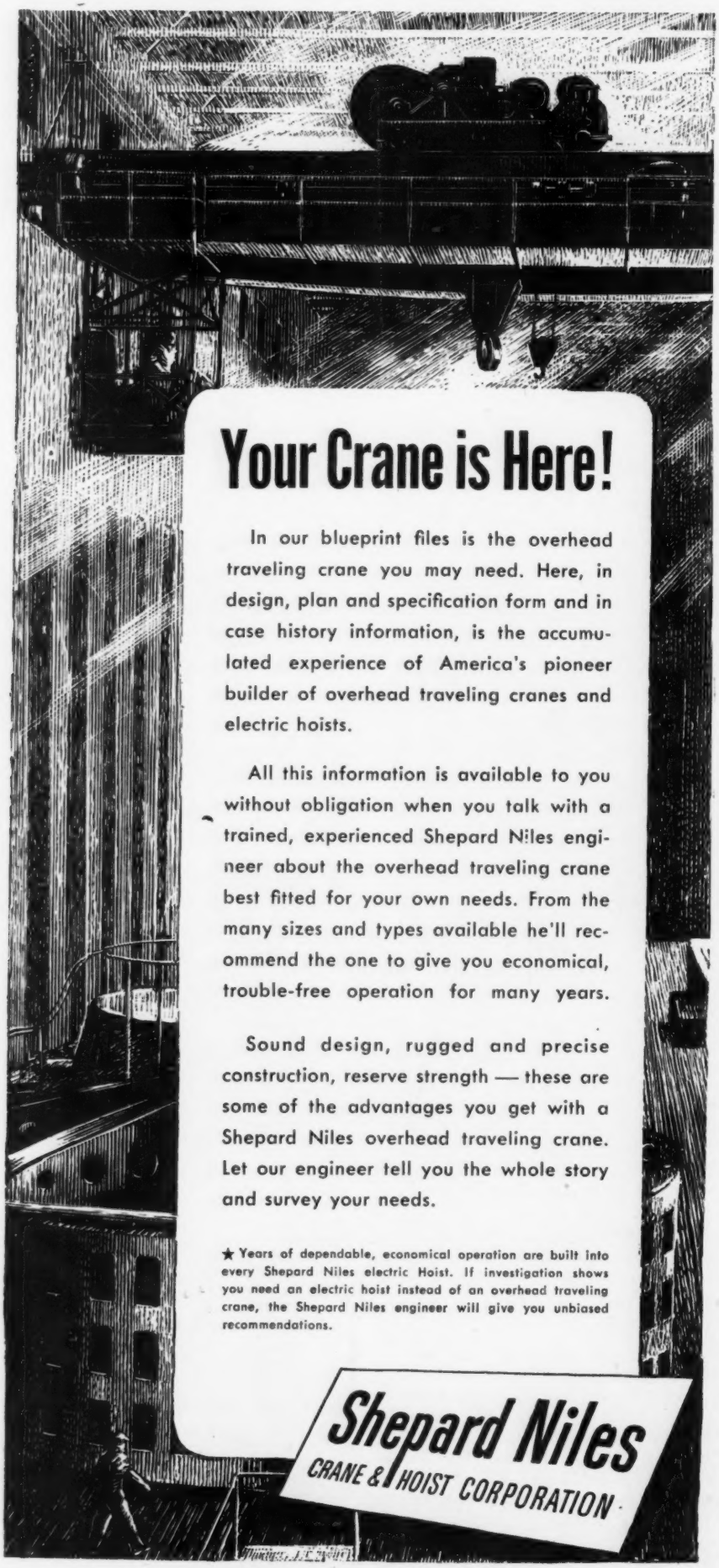
5. Speed Reducer

Ratios from 5:1 to 72:1 are supplied by the new series M-1400 and M-1300 motorized speed reducers in 1/4 and 1/3-horsepower capacities, announced by Ohio Gear Co., 1359 East 179th St., Cleveland, O. Output is from 317 to 24 revolutions per minute and output torque from 43 to 354 inch-pounds.

Housings are of aluminum alloy and worm gears of gear bronze. Worm and



motor shaft are integral and of hardened steel, ball bearing mounted. Two types of general purpose motors are offered: A capacitor type in 115 and 230-volt ratings; and a 3-phase type in 220/440 volts. Both are of drip-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In our blueprint files is the overhead traveling crane you may need. Here, in design, plan and specification form and in case history information, is the accumulated experience of America's pioneer builder of overhead traveling cranes and electric hoists.
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Shepard Niles
CRANE & HOIST CORPORATION
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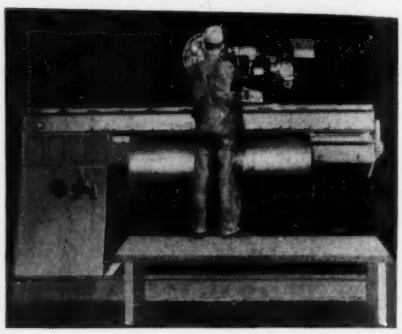
proof construction. Syncrosnap starting switch eliminates damage through burned-out windings.

6. Seam Welder

Positive copper backup for automatically welding longitudinal seams in tanks and other cylindrical shapes is provided with a longitudinal seam welder recently developed by Reed Engineering Co., 1003-17 West Fairview Ave., Carthage, Mo. Copper backup bar is forced upward against the copper hold down clamps by means of an air operated toggle linkage which exerts sufficient pressure



to press seam flat and back up edges during welding operation.

Machine is available in six standard sizes ranging from 6 feet by ⅜-inch thickness up to 9 feet by ¾-inch thickness. All standard machines will handle diameters up to 40 inches and special machines can be obtained for larger diameter work. It is available with tracks to fit any standard type automatic welding head and can also be obtained with water cooling on main back up bar.

7. Screw Machine Tools

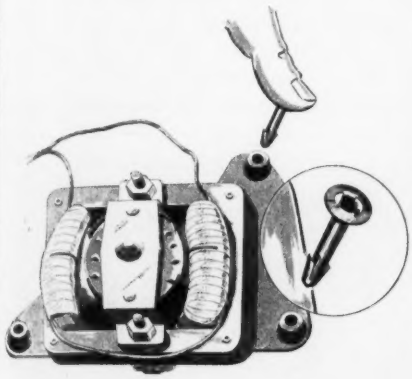
Announced by Brown & Sharpe Mfg. Co., Providence 1, R. I., are three new screw machine tools, a closer for opening die holders, turret tool adapters and revolving stock stops for turrets. The No. 200 closer for opening die holders may be used on all three sizes of No. 00, 0 and 2 automatic screw machines for closing self-opening die heads. It is attached to the top front of bed castings of machines and has longitudinal adjustment to permit correct positioning.

No. 20-00, 22-00 and 22-20 turret tool adapters permit use of screw machine tools in larger machines than those for which the tools were designed. Revolving stock stops position the end of the stock at a specified distance from nose of collet. Heads are hardened and ground. Thrust on head is taken by a ball which allows the head to rotate freely

and prevents marring of the outer end of the workpiece. Five models are available.

8. Push-In Fasteners

Push-in type snap fasteners that require no thread or special receptacles for secure holding were recently developed by Shakeproof Inc., 2501 North Keeler Ave., Chicago 39, Ill. They are stamped from spring steel and form a resilient, vibration resistant lock to hold sheets, panels and brackets in place. No further

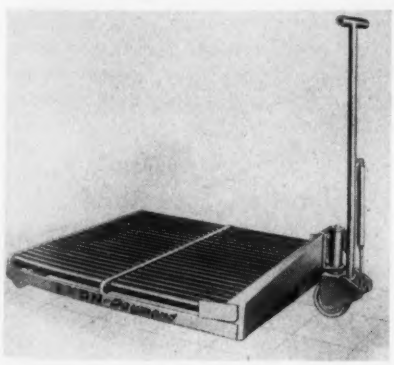


rotation or setting operation is necessary after fastener has been pushed in place with thumb.

Steel prongs are stamped as an integral part in forming, are compressed as fastener is pushed into a punched or drilled hole and spring out again on far side of joint to hold assembly together. They can accommodate total material thickness variations of more than 1/13-inch without loss of efficiency.

9. Pallet Switcher

Transfer of loaded pallets to a roller conveyor after loading inside a freight car is possible with the special truck with rollers instead of plat-



form, designed by Lyon Raymond Corp., 5036 Madison St., Greene, N. Y. When pallet is loaded, truck is moved to doorway of freight car where a conveyor is set up leading to warehouse. One side of truck is

Micromatic now offers a new multiple spindle, unit constructed, Quill type machine with added power and control for removing more and more stock in less time from harder materials. Completely automatic, electronic control of uniform size within .0001 to .0003 inch in production.

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High Speed at Low Cost

For tool room, stockroom, or maintenance shop, this 6" x 6" capacity hack saw is ideal when you want speed, accuracy, and economical operation at lowest possible investment.

Embodies similar design principles and features of MARVEL heavier duty production saws. Its shaper-link action that provides quick return stroke, and its heavy pressure screw feed are two exclusive MARVEL features that provide FASTER cutting than can be obtained with any other metal saw in its price class.

Single speed, 2-speed, and 4-speed models are available, to suit all types of applications where materials of different hardness and alloy characteristics are to be cut. Cabinet base or open-leg base are optional.

Metal Cutting MARVEL SAWS
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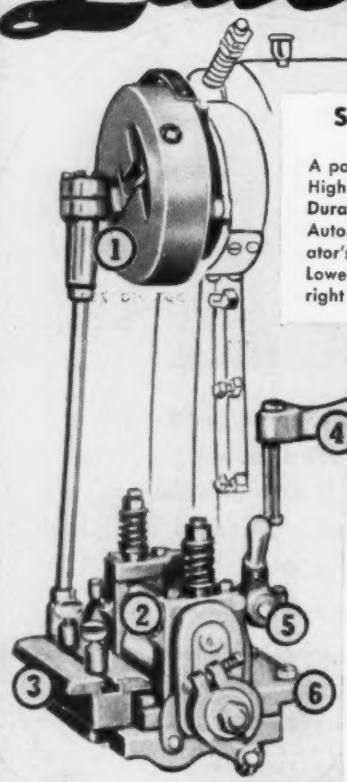
STYLE M

A positive Roll Feed for your punch press. High speed drive. Silent. Accurate. Durable. Hardened, ground feed rolls. Automatic. No need to endanger operator's hands between punch and die. Lower insurance rate. Unit supplied for right or left feeds.



1. 2-pc. driving disc. Adjustable timing.
2. Non-slip, non-marking feed rolls.
3. Silent, positive roller drive.
4. Bracket lifts roll for pilots to locate work.
5. Extra strong feed construction.
6. Bracket easily attached to press.

Request Bulletins

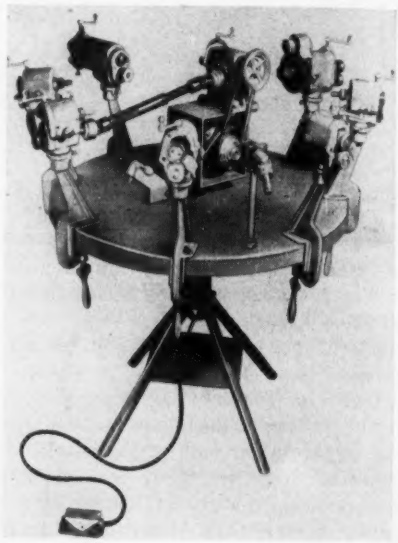
F. J. LITTELL MACHINE CO.
4165 Ravenswood Ave.
CHICAGO 13, ILL.

lined up with conveyor and pallet is pushed on to the conveyor system.

Truck is designed to handle standard 48-inch pallets. Rollers are in double rows, spaced on 2-inch centers. Loads up to 4000 pounds may be handled. Platform height is 5½ inches. Hinged stops prevent pallet from rolling off the truck while it is being moved about.

10. Rotary Table

Central power for a variety of hand cranked tools and machines is provided by the Roto-Table, designed by Roto-Table Co., 2605 East Third St., Dayton 3, O. The single power unit speeds production, saves manhours and manpower and requires a



small space. Applications include use in sheetmetal shops, machine shops, etc.

The 42-inch diameter table rotates around a central shaft, attached to an electric motor driven gearbox. A spring loaded arm having universal joints and sockets at each end, connects the drive unit with machines mounted around the rim of the table. V-belts provide three speed ranges. A foot switch controls both forward and reverse motion.

11. Flycutter, Face Mills

Made to fit conventional arbors and standard American spindle nose drives of milling machines is the new series of flycutters and face mills announced by Kendall Corp., 2361 North 29th St., Milwaukee 10, Wis. Hexagon shaped tool bit holders permit easy angular setting of tool bits. Angular setting of tool bit holder is maintained when tool bit is removed for grinding.

Clamping of tool bit in tool bit

holder is by a tapered spacer, clamping wedge and clamp screw located in cutter body so as to receive no shearing stress. Cutter body is of heat treated steel. Design assures minimum tool vibration, adequate chip clearance. Surface milling, slotting, straddle and form milling may be performed.

12. Milling Fixture

Self centering device on the universal part holder milling fixture, introduced by Mueller Industries, 4755 North Rockwell St., Chicago 25, Ill. assures accurate and rapid production. Part holder may be used on milling, drilling, assembling, threading, counterboring, etc., being operated by manual, automatic, pneumatic or mechanical means.

Clamp jaws have a 3/16-inch maximum opening which will allow a work piece to be gripped behind a shoulder. Work up to 1 inch, round or hexagon, or odd-shaped in that range, may be accommodated. It is designed to allow for adequate chip clearance as well as sufficient coolant entry. Manual operation is by means of a hand lever. Addition of a connecting rod or plunger and air plug adapts it for mechanical or pneumatic operation.

13. Densitometer

Developed by Applied Research Laboratories, 4336 San Fernando Rd., Glendale 4, Calif., is the model 5400 film projection comparator-densitometer for making comparisons with master films and obtaining transmission readings of spectrum lines photographed on 35 mm spectrum analysis film. Instrument consists of two film stages for individually moving the sample film and the master film. For comparison they are brought into exact alignment by vernier action.

Small portions of each film are projected with 20X magnification on a green translucent screen where measurements on scales on the screen or comparison with the master are made. Transmission readings are made by mechanically scanning a line with a 0.0007-inch slit. Light coming through slit is picked up by photo tube, amplified and converted to transmission readings by a projection galvanometer and projected on the screen.

14. Multioperation Machine

Combining a series of core drilling, drilling, boring, counter boring, spot facing, chamfering and semifinish boring operations to save floor space, reduce handling and to control accuracy, a special machine, built by Snyder Tool & Engineering Co., Detroit, Mich., automatically machines cylinder blocks. Block is moved from conveyor on to first transfer plate which acts as a turn table.

Starting automatic work cycle moves the positioned parts to first

(For more information, use the card following page 150.)

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A cleaning operation required frequent lifting of a basket of parts in and out of the tank.

A Reading Electric Hoist with unit construction provided a special solution without special engineering cost. The built-in trolley permitted easy movement. The rigid arm push button gives control of both motions. The D.C. motor and controller were also standard mechanisms.

The Reading Electric Hoist unit construction plan gives you 144 combinations of standard mechanisms to give special solutions to your materials handling problems.

For full information, write for "144 Answers to Your Hoisting Problems".

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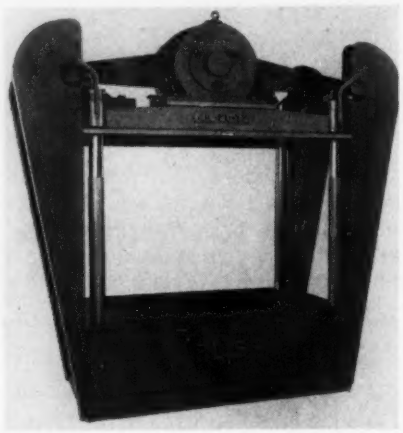
OVERHEAD TRAVELING CRANES

READING HOISTS

work station. Transfer mechanism is hydraulically actuated and transfers eight blocks simultaneously, each one being moved progressively from station to station until delivered at the end of the machine with all operations completed. Machine has screw type chip conveyors in base. Production is 40 units per hour at 80 per cent efficiency.

15. Welding Press

Complicated large metal sections may be assembled at high speeds with the automatic, one-step welding press developed by E. W. Bliss Co., 450 Amsterdam Ave., Detroit 2, Mich. In operation, units to be assembled are placed in position on lower die or preloaded on conveyors, after



which the press cycle is completed automatically. Lower die is raised until it contacts upper die which contains welding tips. Limit switches stop slide in correct position.

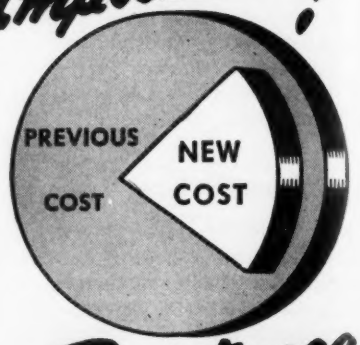
Press is offered in two models, the same except for position of driving mechanism, the 4LU series, for use in places of limited headroom, has the drive in the base. Where the headroom is no object, the 4L series is used. This model permits a change stroke from 12 to 16 inches without part change. Presses can be built to accommodate practically any size section. Strokes per minute vary from 20 to 40 in the overhead drive type to 20 to 60 in the underdrive type.

16. Cable Connector

Offered in 25 sizes, the XTP line of one piece, hinged connectors, made by O. Z. Electrical Mfg. Co., 262 Bond St., Brooklyn, N. Y., will do the work of 32 different connectors of other types. The sizes offered will accommodate over 400 wire combinations ranging from No. 8 to 1,000,000 CM. It can be permanently attached to the main and left for the tap to be attached later.

One end of connector is snapped

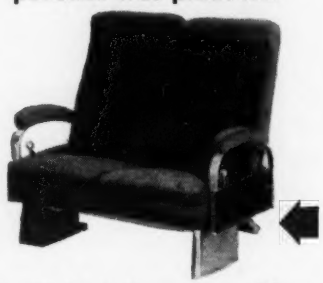
Impossible?



Resistance Welding did it!

At Heywood-Wakefield, for instance, re-designing of the coach seat pedestal for assembly by resistance welding had the following results:

1. **The Progressive Seam Welder paid for itself in the first few weeks of operation.**
2. **Since then it has been saving enough to pay the wages of 10 other H-W workers on other jobs.**
3. **A higher quality seat pedestal was produced.**



You'll find the story of how this was done along with "How 33 operations were cut to 5"; "Simple machine makes petcock wrenches faster"; "How to resistance weld without heavy duty power lines"; and "How to design for projection welding", in

RESISTANCE WELDING PICTORIAL #50
Ask for it, today.

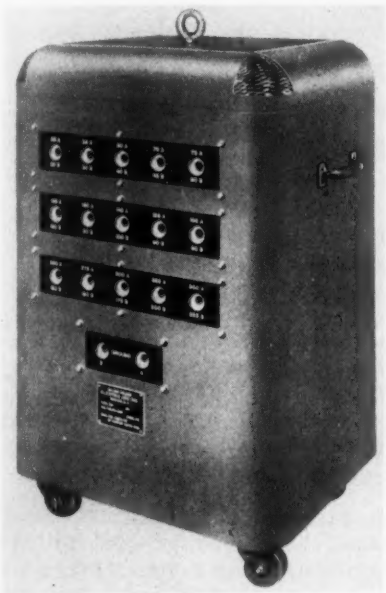
IT PAYS TO WELD

PROGRESSIVE WELDER COMPANY
3050 E. OUTER DRIVE, DETROIT 12, U.S.A

over the main and tightened, while the other has serrated openings to which a tap can be run in any of three directions. Spring steel lock washers, tin plated, maintain permanent pressure. Body is of highly conductive copper alloy.

17. AC Arc Welder

Built for general purpose use, the redesigned Nu-Arc alternating current arc welder, developed by Electric Arc Inc., 152 Jelliff Ave., Newark 8, N. J., has no moving parts. Welder



is a plug-in type with multiple stage heat ranges. Improvement in design was made to assure uninterrupted performance and to reduce delays caused by repairs and replacement of parts.

18. Production Recorder

An electrically operated, gear driven speed and production recorder, built by Electric Tachometer Corp., 22nd and Vine Sts., Philadelphia, Pa., produces a permanent record when installed on any industrial machine. It consists essentially of a synchronizing contactor which may be attached to and driven by the prime mover or machine. The step-by-step motor in the recording instrument is electrically connected to the contactor and follows its motion.

A steel stylus is driven across a wax-coated chart. At 1/2-minute intervals the master clock makes contact to disengage the feed screw which is revolved backward by a return spring restoring pen arm to zero. This cycle of operations, when repeated, produces a series of parallel lines, length of which is propor-

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Pneumatic or solid rubber tires; 9 to 37 ft. booms or adjustable telescopic booms; gasoline or Diesel. Electric magnet, clamshell bucket, and other accessories available. Ask for *Bulletin* #69.

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An intricate plastic mold . . . machined to tolerances of .0005" in HSC CW Oil . . . a preferred steel for its non-deforming qualities—its better machining properties—its dependable results in heat treating.

An unusual assortment of fine tool steels . . . in various sizes, shapes, finishes, conditions . . . available promptly from the conveniently located warehouses of Hoyland Steel Company. Complete technical assistance in solving tool steel problems. Hoyland Steel Catalog-Work Book available on request.

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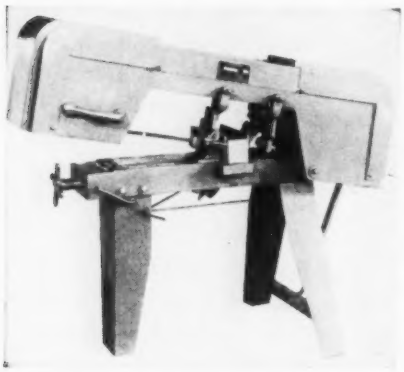
tional to speed or production. Ends of the lines form a speed curve.

19. Horizontal Band Saw

Three blade speeds of 45, 90 and 150 feet per minute are provided by the small horizontal band saw, designed by Johnson Mfg. Corp., 665 Chrysler Building, New York 17, N. Y., with a metal cut-off capacity of 5 x 10 inches. Machine has rigid box type frame with wheel assemblies



mounted high on welded steel brackets bolted high on the frame. Bed is 7 inches wide and 28 inches long.

A hydraulic lift is built into the machine to give correct feed for every section. Duplicate cutting is speeded by a stock stop gage. Controls are within easy reach of operator and wheels are guarded. Machine operates and shuts off automatically. Power for this model B saw is furnished by a 1/3-horsepower motor.

20. Electric Tractor

An electric tractor, light in weight and compact, is a development of Mercury Mfg. Co., Chicago 9, Ill., for reasonably good operating condi-

tions where floor and elevator capacities and operating space are limited and where trailing loads are not too severe. Tractor length is 70 inches, exclusive of coupler and width is 34 inches.

Normal drawbar pull rating is 200 pounds with maximum drawbar pull established at 1000 pounds. Standard power source is a low type, 36-volt battery of 300 ampere-hour capacity. Construction features include double reduction spiral bevel and spur gear drive axle with 18 x 3 inch solid rubber tired wheels and lever type single front axle steering with 15 x 3 1/2-inch solid rubber tired wheels.

DEVELOPED BY . . .

21. Merrill Brothers, Maspeth, N. Y., a strong finger grip for handling sheets or plates. Measuring 6 x 3½-inches, the 28-ounce device enables one man to grip onto a sheet and extract it from a pile. It can be attached to a conveyor system or a mechanical lifting arrangement.

22. Electrol Inc., Kingston, N. Y. the Powerpak control center for hydraulic systems, capable of exerting precision controlled forces from 0 to 1500 pounds per square inch. Unit consists of hand pump, reservoir, two selector valves, relief and check valves.

23. Crown Industrial Products Co. Chicago 15, Ill., marking instrument for electrolytically etching on metal anything that can be typed, written or drawn on a 2½ x 6¾-inch stencil film. Operation consists of placing piece to be marked on stencil and pressing a button.

24. Morse Chain Co., Detroit 8, Mich., new series of silent chain stock drives of ½ and ¾-inch pitch, including sprockets. Stock sizes of sprockets have finished bores for use with Taperlock bushings, reducing installation time.

25. Herman Stone Co., Dayton 2, O., an 8 x 16 foot granite precision surface plate finished to a tolerance of 0.002-inch overall. One piece plate weighs 25 tons.

26. Manning, Maxwell & Moore Inc., Bridgeport 2, Conn., American snap action temperature limiting regulator for processing machinery where shut-off is necessary when critical temperature is reached. Resetting is by manually raising cocking lever. Three sizes, 1/2, 3/4 and 1 inch are for temperatures from 20 to 345°F.

27. Udylite Corp., Detroit, Mich., a twin zinc ball anode, cast by a new high production method for greater manufacturing economies.

28. Kerlow Steel Flooring Co., Jersey City 5, N. J., steel pallets built of grating bars set on edge for greatest strength. Welded together, pallets are designed for eight-way lifting by fork trucks. They are offered plain or with closure.

29. United States Rubber Co., Rockefeller Center, New York, N. Y., slippery finish for electrical wire to make it easier to pull through sharp bends in conduit. Surface is produced by a wax coating and is used on company's Laytex wire.

30. Weksler Thermometer Corp., New York 12, N. Y., Adjust-Angle industrial thermometer with flexible metal capillary within a ball connection which permits adjustments of stem or case to desired position through 180 degrees. It is offered in 7, 9 and 12-inch cases and in standard ranges up to 750° F or equivalent Centigrade.

31. Wichita Falls Foundry & Machine Co., Wichita Falls, Tex., Air-Tube friction disk clutch which features direct axial pressure application by compressed air in a flat circular rubber and fabric airtube. No adjustments are required and it is unaffected by centrifugal force. Present offering is in 18, 24 and 30-inch single and double plate sizes and horsepower ratings from 40 to 1000 horsepower.

32. Sturdimatic Tool Co., Detroit 2, Mich., live center adapted to tube turning, in sizes 1 7/8, 2 3/8, 2 3/4 and 3 1/4-inch diameters. All are offered with standard shank with Morse tapers, but other sizes, tapers and blunt nose types may be made.

33. Ebco Mfg. Co., 401 West Town St., Columbus, O., Oasis electric drinking water cooler, protected against rust from condensation, corrosion from fumes and mechanical damage.

34. Belke Mfg. Co., Chicago 51, Ill., electric unit for pumping acids from carboys. A light weight handle affords ease in moving pump from one carboy to another. Pump motor is 110 volt, 60 cycle, alternating current type. Motor causes compressor to build up air pressure in carboy, forcing out acid through the pipe which may be of lead, hard rubber or saran.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL PRICES— Full import of current price reductions on steel products will be impossible to determine immediately. While the revised schedules of U. S. Steel Corp. subsidiaries have been announced, effective May 1, effecting decreases of $1 to $5 per ton on a long list of products, action by independent producers remains to be taken. This may require a few days.

Indications are the larger independents will promptly follow the lead of U. S. Steel and reduce some prices but they may not follow completely the pattern set by the Steel corporation, both with respect to the amount of the reductions and the specific products. In other words, a dual set of prices may result from independent action of the smaller steelmakers.

Independents likely will price their products on a basis competitive with U. S. Steel, but there may be some exceptions. At the same time isolated advances are expected right along in line with advancing costs. Rejection of steel labor's demand for wage increases appears industry-wide and this fact seems to have definitely stilled talk of a general price markup soon, though it has not written off such possibility months from now since the current wage-price action is largely an experiment, untested by economic realities.

PRICE COMPOSITES— STEEL's arithmetical price composites held unchanged last week and compared with those for the like week a year ago as follows: Finished steel, $81.14 and $69.82, semifinished steel $68.72 and $52.10, steelmaking pig iron $39.18 and $32.49, steelmaking scrap $40.50 and $30.58.

FREIGHT RATES— To some extent lower base prices on steel effected over the next week or so will be offset by freight rate increases scheduled to become effective May 6. While the freight boost will not immediately affect base prices they will result in a prompt increase in delivered mill prices, as well as warehouse quotations. Also the higher freight charges are likely to further shrink the market areas served by the separate mills.

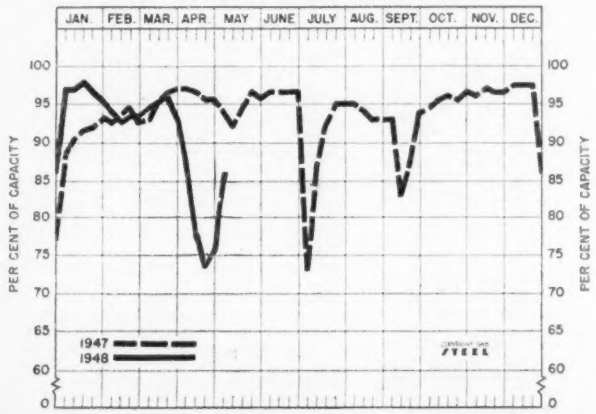
The new rates represent an increase in official classification territory of 30 per cent over rates a year ago. They will replace the 20 per cent interim increase in effect since Jan. 5, which in turn, cancelled out the 10 per cent increase of last October.

STEEL PRODUCTION— Steelmaking operations rose sharply last week and likely will approximate the pre-coal-strike rate by the end of this week. Last week's gain amounted to 11½ points, making the estimated national rate 87 per cent.

STEEL SUPPLY— Third quarter consumer quotas are being set up on a smaller scale largely because of the tonnage lost due to the recent coal strike, but also because of anticipated losses in production attributable to plant shutdowns for mass vacations during the period. Quotas are tentative for the reason producers still are unable to gage the effect of the defense program and European aid requirements. Threat of a possible coal mining stoppage at the end of June also is a factor though hopes prevail that such will be avoided.

RAW MATERIALS— Consumers report a better flow of pig iron and coke but still find it impossible to attain anything like normal operations. Some foundries are planning to suspend operations for a few days so as to build up inventories. Scrap is showing some signs of renewed strength. Reports are heard of steelmaking grades selling above steel mill formula prices but it is difficult to track down such sales. For the most part the steel mills built up scrap inventories during the coal strike to the highest level in months and consequently they are becoming more critical of the quality of material received. At the moment, quality, rather than volume, appears the most pressing problem with respect to steel mill scrap supply.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended May 1	Change	Same Week 1947	Same Week 1946
Pittsburgh	92.5	+10	100.5	55.5
Chicago	86	+ 1	84	66.5
Eastern Pa.	81	+13	91	71
Youngstown	75	+24	91	52
Wheeling	80	+ 8	89	86
Cleveland	97	+ 1.5	93	86
Buffalo	88	+24	88.5	74.5
Birmingham	100	+28	99	64
New England	81	+ 1	95	85
Cincinnati	84	+32	87	83
St. Louis	89	+ 4	68.5	49.5
Detroit	101	None	92	87
Estimated national rate	87	+11.5	94	64.5

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

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COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	May. 1	Apr. 24	Month Ago Apr. 1948	Year Ago May 1947	5 Years Ago May 1943
Finished Steel	$81.14	$81.14	$81.14	$69.82	$56.73
Semifinished Steel	68.72	68.72	68.72	52.10	36.00
Steelmaking Pig Iron	39.18	39.18	39.21	32.49	23.00
Steelmaking Scrap	40.50	40.50	40.41	29.75	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Apr. 1948	3.57975¢
Mar. 1948	3.57435¢
Apr. 1947	3.12077¢
Apr. 1943	2.42785¢

***STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composite, dollars per net ton; pig iron and scrap, gross ton.

†FINISHED STEEL WEIGHTED COMPOSITE: Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 82 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. March and April figures are preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton; others dollars per gross ton.

Finished Materials

	May 1 1948	Apr. 1948	Feb. 1948	May 1947
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.60c
Steel bars, del. Philadelphia	3.356	3.356	3.356	2.98
Steel bars, Chicago	2.90	2.90	2.90	2.60
Shapes, Pittsburgh	2.80	2.80	2.80	2.50
Shapes, del. Philadelphia	2.968	2.968	2.968	2.64
Shapes, Chicago	2.80	2.80	2.80	2.50
Plates, Pittsburgh	2.95	2.95	2.95	2.65
Plates, del. Philadelphia	3.19	3.19	3.19	2.85
Plates, Chicago	2.95	2.95	2.95	2.65
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.95	3.95	3.95	3.55
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Gary	3.95	3.95	3.95	3.55
Strip, hot-rolled, Pittsburgh	3.05	3.05	2.925	2.50
Strip, cold-rolled, Pittsburgh	3.80	3.80	3.675	3.20
Bright basic, bess. wire, Pittsburgh	3.775	3.775	3.775	3.425
Wire nails, Pittsburgh	5.20	5.20	4.95	4.125
Tin plate, per base box, Pittsburgh	$6.70	$6.70	$6.70	$5.75

Semifinished

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$56.79	$44.64
Slabs, Pittsburgh, Chicago	45.00	45.00	42.59	37.51
Rerolling billets, Pittsburgh	45.00	45.00	42.59	37.51
Wire rod 7/32 to 1/4-inch, Pitts.	3.175c	3.175c	3.175c	2.55c

Pig Iron

	May 1 1948	Apr. 1948	Feb. 1948	May 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$40.996	$40.996	$40.996	$34.83
Basic, Valley	39.00	39.00	39.00	33.00
Basic, eastern del. Philadelphia	42.004	42.004	42.004	35.52
No. 2 fdry., del. Pgh. (N.&S. sides)	40.496	40.496	40.496	34.33
No. 2 fdry., del. Philadelphia	42.504	42.504	42.504	36.02
No. 2 foundry, Chicago	39.00	39.00	39.00	33.00
No. 2 foundry, Valley	39.50	39.50	39.50	33.50
Southern No. 2, Birmingham	37.88	37.88	37.88	29.28
Southern No. 2, del. Cincinnati	42.23	42.23	40.74	34.75
Malleable, Valley	39.50	39.50	39.50	33.50
Malleable, Chicago	39.50	39.50	39.50	33.50
Charcoal, low phos., fob Lyles, Tenn.	55.00	55.00	55.00	40.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.25

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.25	$40.25	$40.44	$30.00
Heavy melt. steel, No. 2, E. Pa.	39.00	39.00	39.125	28.00
Heavy melt. steel, No. 1 Chicago	39.25	39.10	39.125	29.25
Heavy melt. steel, No. 1, Valley	40.25	40.25	40.25	31.55
Heavy melt. steel, No. 1, Cleveland	39.75	39.75	39.75	30.75
Heavy melt. steel, No. 1, Buffalo	43.00	43.00	43.63	32.20
Rails for rerolling, Chicago	49.50	49.50	51.00	34.50
No. 1 cast, Chicago	69.00	68.40	66.00	38.50

Coke

Connellsville, beehive furnace	$12.75	$12.50	$12.50	$9.125
Connellsville, beehive foundry	14.875	14.875	14.78	10.375
Chicago, oven foundry, del.	19.25	19.25	19.25	16.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95 per gross ton. Forging quality $46 per net ton, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56 per gross ton.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Buffalo, Birmingham, $45 per net ton; Cleveland, $47 per net ton; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $54 per net ton.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66 per gross ton.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60 nom., per net ton; sales in open market $95-105 per gross ton.

Skelp: Pittsburgh, Youngstown, 2.90c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70 per net ton; some sellers quoting up to $120 per gross ton.

Wire Rods: Pittsburgh, Chicago, Birmingham, 7/32 to 1/4-in., inclusive, $2.80-3.55 per 100 lb. 5/16 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.5245.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.06c-3.114; eastern Mich., 3.13-3.18c; New York, del., 3.392c; Phila., del., 3.356c; San Francisco (base, del.), 3.6345-3.95c; Los Angeles (base, del.), 3.629-3.86c; Seattle, 3.8375-3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.71c; Toledo, 3.78c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base 4.10c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.3345c; Los Angeles (base, del.), 3.329c; Seattle, 3.88c-4.18c base.

Iron Bars: Single refined: Pittsburgh 7.70c (hand puddled), Economy, Pa., 8.65c. Double refined: Pittsburgh 9.75c (hand puddled), Economy, Pa., 10.00c. Staybolt: Pittsburgh 11.25c (hand puddled), Economy, Pa., 10.20c.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Detroit, del., 2.96-3.01c; eastern Mich., del., 3.03-3.08c; Philadelphia, del., 3.04c; New York, del., 3.172c; Los Angeles (base, del.), 3.544c; San Francisco, (base, del.) 3.5495c, (Alan Wood Steel Co., Conshohocken, Pa., quotes 4.20c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland. Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.71-3.76c; eastern Mich., del., 3.78c-3.83c; New York, del., 4.042c; Philadelphia, del., 4.006c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Canton, Middletown, 3.95c; Kokomo, 4.55c; Youngstown, 3.95-4.45c; Granite City, 4.35c; New York, del., 4.322c; Philadelphia, del., 4.19c; Los Angeles (base, del.), 4.724c; San Francisco (base, del.), 4.7295c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c; Granite City 5.00c and 5.35c, respectively; copper alloy, 4.90c, Kokomo. Los Angeles (base, del.), 5.344c; San Francisco (base, del.), 5.3495c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Middletown, 3.95c; Youngstown 3.95c-4.45c; Granite City, 4.05c; Detroit, del., 4.11c-4.16c; eastern Mich., 4.18c-4.23c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c, Armature: Pittsburgh, 4.80c-5.30c; Chicago, Gary, 4.80c; Granite City, Ill., 5.25c; Kokomo, Ind., 4.90c. Electrical: Pittsburgh, 5.30c-5.80c; Chicago, Gary, 5.30c; Granite City, Ill., 5.75c; Kokomo, Ind., 5.40c. Motor: Pittsburgh, 6.05-6.80c; Chicago, Gary, 6.05c; Granite City, 6.50c. Dynamo: Pittsburgh, 6.75c-7.00c; Granite City, 7.20c. Transformer 72, 7.25-8.25c; 65, 7.95-9.20c; 58, 8.65-9.90c; 52, 9.45c, Pittsburgh.

Strip

Hot Rolled Strip: Pittsburgh, 2.80c-3.30c; Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.96-3.01c; eastern Mich., del., 3.03-3.08c; San Francisco (base, del.), 3.80c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, 3.55c-4.05c; Cleveland, Youngstown, 3.55c-3.85c; Chicago base, 3.65c; Detroit, del. 3.71-3.76c; eastern Mich., 3.78-3.83c; Worcester base, 3.75c-4.45c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., per base box of 100 lb, 1.25 lb coating $6.60, 1.50 lb coating $6.80; Granite City, Birmingham, Sparrows Point, 1.25 lb coating $6.70, 1.50 lb coating $6.90.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.25 lb tin, $5.80; 0.50 lb tin, $6.00; 0.75 lb tin $6.20; Granite City, Birmingham, Sparrows Point, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 55 to 70 lb basis weight, $5.20; 75 to 95 lb basis weight, $5.10; 100 to 128 lb basis weight, $5.20.

Holloware Enameling Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage, 4.75c per lb; Granite City, Birmingham, Sparrows Point, 4.85c per lb.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb, $5.90; Granite City, Birmingham, Sparrows Point, $6.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, 3.45c; Claymont, 3.65c; Geneva, Utah, (base, del.), 3.125c; Det., del., 3.21c; New York, del., 3.322c; Phila., del., 3.19c; Boston, del., 3.423c; St. Louis, del., 3.269c; San Francisco and Los Angeles, del., 3.693c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa., 5.10c, basing points.)

Floor Plates: Pittsburgh, Chicago, Cleveland, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.80c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 24.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.088c; Phila., del., 2.968c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41-3.474c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.543c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds.)

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.55-4.00
Basic MB Spring (except Birm.)	**$4.95
Upholstery Spring (except Birm.)	†$4.60

Wire Products to Trade in carloads

Wire, Merchant Quality	
Annealed (6 to 8 base)	†† $4.20
Galvanized (6 to 8 base)	††$4.65

(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).

Nails	
Standard, cement-coated, galvanized	‡94
Staples, polished and galvanized	‡‡94
Woven fence, 15½ gage and heavier	§100
Barbed wire, 80-rod spool	§§113
Fence Posts (with clamps)	107
Bale ties, single loop	§99

* Worcester, $3.65; Duluth, $3.60, base; San Francisco (base, del.), $4.56, bright basic only.

** Worcester, $5.05; Duluth & Trenton, N.J., $5.20 (bright only); San Francisco (base del.) $5.9845.

† Worcester $4.70; Duluth and Trenton, N. J., $4.85, base. San Francisco (base, del.) $5.6345 black upholstery.

†† One producer quotes 25 cents higher at Birmingham and Chicago; Worcester $4.30, annealed, $4.75, galvanized; Duluth $4.20, annealed, $4.65, galvanized; Kokomo, Ind., $4.80 annealed, $5.25 galvanized; San Francisco (base, del.) $5.21, annealed, $5.66 galvanized.

‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester 100; Cleveland 97; San Francisco (base, del.) 115.

‡‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester 100, San Francisco (base del.) 115.

§ San Francisco (base del.) 123.

§§ San Francisco (base del.) 133.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail-steel), Williamsport, Pa., Pittsburgh prices upon application.
Relaying, 60 lb and over fob warehouse $60-$65 per net ton.
Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.65 per 100 lb, fob mill; $3.40 base, Seattle; $3.80 base, Pittsburg, Calif. Splice bars $3.85 per 100 lb fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld				
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	44½	17	1	52½	36½
¼	44½	21½	1¼	53	37
⅜	41	17	1½	53½	37½
½	47	29½	2	54	38
¾	50	33½	2½ & 3	54½	38½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	44½	28	44	27½	43½	27
2½ & 3	48½	32	47	30½	46½	30
3½-6	50½	34	49	32½	48½	32

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	43½	1	51½
¼	43½	1¼	52
⅜	40	1½	52½
½	46	2	53
¾	49	2½ & 3	53½

In.	Lap Weld	Elec. Weld	Seamless
2	43½	43	42½
2½ & 3	46½	46	45½
3½-6	48½	48	47½
8	50½	50	49½
10	50	49½	49
12	49	48½	48

Standard Wrought Iron Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh.

	Butt Weld		Lap Weld		
In.	Blk.	Gal.	In.	Blk.	Gal.
⅜	+46½	+74½	1¼	+12	+34½
½	+11	+35	1½	+ 6	+27½
¾	+ 1½	+25	2	— 1½	+20
1 and 1¼	— 4	+16½	2½-3½	— 4	+16
1½	— 9½	+13	4	— 8	+10½
2	—10	+12½	4½-8	— 6	+12
			9-12	+ 3	+21½

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$12.46	$11.51	$11.51
1¼"	13	....	14.76	11.48	13.64
1½"	13	$14.00	16.47	12.69	15.22
1¾"	13	15.92	18.74	14.43	17.31
2"	13	17.84	20.99	16.17	19.39
2¼"	13	19.88	23.40	18.02	21.62
2¼"	12	21.90	25.77	19.86	23.80
2½"	12	23.99	28.21	21.75	26.06
2¾"	12	25.42	29.90	23.05	27.63
3"	12	26.68	31.40	24.18	29.00
3¼"	11	31.06	36.55	28.16	33.77
3½"	11	33.35	39.26	30.23	36.27
4"	10	41.40	48.70	37.53	44.99
4½"	9	54.87	64.58	....	....
5"	9	63.52	74.74	....	....
6"	7	97.51	114.73	....	....

Pipe Cast Iron: Class B, 6-in. and over $79.50 per net ton, Birmingham; $84.50, Burlington, N. J.; $91.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 19c per cwt in carlots, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step, plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ¾ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in and smaller	46 off	.....
½-in. and smaller	.....	44 off
⅝-in.-1-in.	44 off	.....
⅛-in.-1-in.	.....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	.....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	.....5.65c plus 19c per cwt in cl., 26c lcl.
7/16-in. and under	55 off
Lebanon, Pa.	.....55 off plus 19c per cwt in cl., 26c lcl.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, cents per lb, Pittsburgh, Chicago, and Washington, Pa.

Grade	Bars, Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50*	51.00*	40.50	51.00
310	53.50	56.50†	57.50‡	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442, 443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
§501	9.00	13.00	17.50	13.00	18.50
§502	10.00	14.50	18.50	14.50	19.50
****STAINLESS CLAD STEEL (20%)**					
304	....	....	24.00	22.00	....	....
410	....	....	22.00	20.00	....	....
430	....	....	22.50	20.50	....	....
446	....	....	29.00	27.00	....	....

One producer quotes: * 6.50c higher, † 3.50c higher, ‡ 10.00c higher. § Low chromium. ** Fob Pittsburgh, Washington and Coatesville, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.208	42.708	43.208	43.708
Brooklyn, N. Y., del.	....	44.10	44.60	....
Philadelphia, del.	42.004	42.504	43.004	43.504
Birmingham, base	35.88†	36.38†	....	....
Cincinnati, del.	....	42.23	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	47.776	47.776	48.276	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.08	40.58	41.08	41.58
Muskegon, Mich., del.	....	43.60	44.10	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.50	41.00	41.50	42.00
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	39.50	40.00	40.50	....
St. Louis, del.	40.25	40.75	41.25	....
Neville Island, Pa., base	39.00	39.50	39.50	40.00
Pittsburgh, del., N.&S. Sides	39.996	40.496	40.496	40.996
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Los Angeles, San Francisco	46.13	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	39.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	42.70	43.20	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.57	43.07	43.07	43.57

† Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Jan. 1, 1948; Republic quotes $2.375 higher for No. 2 foundry and malleable and $1.875 higher for basic at Buffalo, and $1.25 higher at Cleveland, effective on shipments during week ended May 2.

‡ To Neville Island base add: 79.2c for McKees Rocks, Pa., $1.212 Lawrenceville, Homestead, McKeesport, Monaco; $1.788 Oakmont; $1.596 Verona; $1.788 Brackenridge; 99.6c to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$49.50
6.51-7.00..$50.75 9.01- 9.50. 57.00
7.01-7.50.. 52.00 9.51-10.00. 58.25
7.51-8.00.. 53.25 10.01-10.50. 59.50
8.01-8.50.. 54.50 10.51-11.00. 60.75
8.51-9.00.. 55.75 11.01-11.50. 62.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron 8% 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.05% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.....$55.00 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $39.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.592, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$13.50
Connellsville, foundry	14.00- 15.75
New River, foundry	15.50
Wise county, foundry	14.25
Wise county, furnace	13.50

Oven Foundry Coke

Kearney, N. J., ovens	$20.50
Chicago, outside del.	18.00
Chicago, del.	19.25
Terre Haute, ovens	18.50
Milwaukee, ovens	18.75
New England, del.	20.40-20.45
Birmingham, del.	15.76
Indianapolis, ovens	18.50
Cincinnati, del.	18.95
Ironton, O., ovens	16.75
Erie, Pa., del.	19.45
Painesville, O., ovens	18.10
Cleveland, del.	19.60
Buffalo, del.	20.15
Detroit, del.	19.00
Philadelphia, ovens	17.75
Swedeland, Pa., ovens	17.75
Portsmouth, O., ovens	17.00

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	21.00†
Toluol, two degrees	28.00
Industrial xylol	28.00
Solvent naphtha	28.00

Per pound fob works

Phenol (car lots, returnable drums)	12.50
Do., less than carlots	13.25
Do., tank cars	11.50

Eastern plants, per pound

Naphthalene flakes, balls, bbl. to jobbers, "household use"	11.00

Per ton, bulk, fob plants

Sulphate of ammonia	$40.00

† Freight allowed up to 2 cents.

Refractories

Net Prices

Per 1000, fob shipping point

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$92.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	73.00
Ala., Ga.	73.00
N. J.	78.00

Intermediate Heat Duty

Ohio	67.00
Pa., Ill., Md., Mo., Ky.	67.00
Ala., Ga.	59.00
N. J.	70.00

Low-Heat Duty

Pa., Md., Ohio	59.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	50.00
Wire Cut	48.00

Malleable Bung Brick

All bases	$3.00

Silica Brick

Pennsylvania	73.00
Joliet, E. Chicago	82.00
Birmingham, Ala.	73.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	64.00
Chem. bonded chrome	64.00
Magnesite brick	86.00
Chem. bonded magnesite	75.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	27.00
Single bags	31.50

Dolomite

Domestic, dead-burned, bulk, net tons, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom
Swedish basic, 60 to 68%	13.50-14.00
Spanish, No. African basic, 50 to 60%	Nom
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheet, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	6.00	...	...	...	...	6.00	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30†	5.30†	5.30	...	...	...	...	...
Shapes, Structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

† Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½"& up	H-R Alloy (**4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	5.03	6.09[4]	5.79[4]	6.23[4]	7.58[4]	5.61	6.87	5.04	5.88	7.64	4.91	5.18	6.86
New York (city)	4.96	6.16	5.86	6.16	7.51	5.59	...	5.06	5.63	7.23	4.80	5.11	6.78
New York (country)	4.81	6.01	5.71	6.01	7.36	5.44	...	4.91	...	...	4.65	4.96	6.63
Philadelphia (city)	4.70	6.32	5.92	5.90	7.25	5.32	5.72	4.87	5.75	8.77	4.57	4.85	6.47
Philadelphia (country)	4.55	6.18	5.78	5.75	7.10	5.17	5.57	4.73	...	...	4.47	4.71	6.32
Baltimore (city)	4.32†	5.95	5.65	5.72	7.07	4.80	...	4.85	5.71	...	4.71	4.77	6.30
Baltimore (country)	4.17†	5.80	5.50	5.50	6.85	4.65	...	4.70	...	...	4.56	4.62	6.15
Washington (city)	4.81	...	...	...	...	5.08	...	5.14	5.79[12]	...	4.98	5.03	6.60
Washington (country)	4.71	...	...	...	...	4.98	...	5.04	...	...	4.88	4.93	6.50
Norfolk, Va.	4.90	...	...	...	...	...	...	5.20	6.00	...	5.15	5.15	6.90
Memphis, Tenn. (city)	4.82[20]§§	5.87[20]†	...	6.37	...	5.02[20]	...	4.97[20]	5.87	...	4.97[20]	5.17[20]	6.87[20]
Memphis, Tenn. (country)	4.72[20]§§	5.77[20]†	...	6.27	...	4.92[20]	...	4.87[20]	5.77	...	4.87[20]	5.07[20]	6.77[20]
Buffalo (city)	4.45	...	5.20[8]	6.05	...	5.25	5.65	4.40	5.10	6.85	4.40	5.00	6.25
Buffalo (country)	4.30	...	5.05[8]	5.50	...	4.70	5.50	4.25	4.95	6.85	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	...	5.10[8]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10§§	...	4.95[8]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.82	7.17	4.55	5.35	4.40	5.10	7.26	4.70	4.60	6.05
Cleveland (country)	4.30	5.35[8]	5.05[8]	...	...	...	5.20	4.25	4.95	...	...	4.45	5.90
Cincinnati	4.56	...	5.22	5.77	...	4.77	...	4.78	5.63	...	4.82	4.98	6.47
Detroit	4.55	...	5.30	...	...	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[8]	...	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.45	4.40	5.10	6.85[9]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.30	4.25	4.95	6.85[9]	4.25	4.45	5.90
Milwaukee	4.658	5.708[8]	5.408[8]	5.858	7.108	4.558	5.658	4.608	5.308	7.208[9]	4.608	4.808	6.258
St. Louis	4.78	5.83[8]	5.53[8]	6.02	7.27	4.68	5.82	4.73	5.47[12]	...	4.73	4.93	6.38
Birmingham (city)	4.45[20]§§	...	...	5.65	...	4.45[20]	...	4.40[20]	5.93[22]	...	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	...	...	5.50	...	4.30[20]	...	4.25[20]	...	...	4.25	4.50	...
New Orleans	4.98[20]**	...	6.29[18]	...	...	5.18[20]	...	5.13[20]††	6.29[11]	...	5.03[20]††	5.33[20]	7.29[20]
Omaha, Nebr.	5.462	...	...	6.712	8.012	5.362	...	5.412	6.112	7.562	5.412	5.612	7.062
Houston, Tex.	5.75	...	...	7.36	8.10	6.00	...	5.35	7.00[12]	...	5.85	5.85	6.50
Los Angeles (city)	5.75	7.75[8]	7.45[8]	7.40	8.80	6.05	8.70	5.50	7.35[22]	9.35[10]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[8]	7.30[8]	7.25	8.65	5.90	8.55	5.35	7.20[1]	9.20[10]	5.20	5.40	7.50
San Francisco	5.40[21]	6.65[8]	...	7.05[8]	7.95[8]	5.75[21]	8.70[18]	5.05[21]	7.00[12]	...	5.30[21]	5.50[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]§§	...	7.10[8]‡	6.95	...	5.60[17]	...	5.45[17]	7.45[19]	8.50[12]	5.25[17]	5.55[17]	7.65[17]
Portland, Oreg.	5.30[17]§§	...	7.10[8]‡	6.70	...	5.60[17]	...	5.45[17]	7.45[19]	...	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [8]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [18]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c per 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $52, Palmerton, Pa., $51, Pittsburgh, 16% to 19% Mn., $51 Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l.,8MxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10% C 26.0c, 0.15% C 25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si, carload packed 10.9, ton lot 12.35c, less ton 14.0; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (All 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained, Si carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb or briquet, carload packed 13.2c ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

(*Continued on Page 174*)

ERP Metal Needs Estimated

United States to supply 58,000 tons of copper and 44,000 tons of zinc in next fiscal year. Copper use gains but order backlog continues to drop

New York—United States will have to supply about 58,000 tons of copper and 44,000 tons of zinc to nations participating in the European Recovery Program during the fiscal year 1948-49. Canada will supply 60,000 tons of copper and 70,000 tons of zinc while other western hemisphere countries will contribute 181,000 tons of copper and 118,000 tons of zinc. These constitute the latest estimates of the State Department and were presented to the House Appropriations Committee by Paul G. Hoffman, administrator, Economic Co-operation Administration.

Copper—Consumption of copper by fabricators increased about 5000 tons in March compared with the previous month's and the like 1947 month's total, but showed a decline of 7060 tons from the January total of 127,227 tons, according to the Copper Institute. Deliveries of refined copper by producers to fabricators in March totaled 122,988 tons, or 2821 tons in excess of consumption. Fabricators' refined stocks of copper at the end of March totaled 408,697 tons against 406,029 tons at the end of February. Unfilled orders declined for the third consecutive month, amounting to 292,355 tons at the end of last month compared with 338,260 tons at the beginning of the year and 494,611 tons at the end of January, 1947. The deficit in the consumers' sales position was cut 10,808 tons to 85,652 tons at the end of March compared with 121,343 tons at the end of last January and 306,390 tons at the end of January, 1947.

Shipments of copper and copper-base alloy castings increased 2 per cent in February to a total of 87,169,000 pounds compared with 85,432,000 pounds in January, according to the Bureau of the Census.

Brass—Some brass ingot makers raised their bids for red metal scrap ¼ to ½-cent a pound in an effort to bring out larger supplies. The scrap supply situation improved moderately following the upward revision and one of the leading producers lowered his prices ¼-cent a pound to 19.25c for No. 115, 18.75c for No. 120 and 18.25c for No. 123 ingot, thereby eliminating a price spread.

Lead—Production of refined lead increased 6495 tons in March to 50,093 tons from 43,598 tons in February, making the first quarter total 144,512, or an increase of about 3600 tons over the like 1947 period. Shipments during March were higher at 52,287 tons compared with 47,200 tons in February. Total shipments for the first quarter of this year amounted to 151,445 tons against 146,891 tons in the like period of last year. Of March's shipments, cable makers received 13,776 tons and battery makers, 8646 tons. Stocks of refined lead at the end of March declined to 14,837 tons from 17,034 tons and were the smallest since November, 1941. Production of antimonial lead increased to 10,993 tons in March from 9067 tons in February.

The tight supply situation is aggravated by continuation of the strikes at many important lead mines in Mexico.

Shipments of lead and lead-base alloy die castings amounted to 1,079,000 pounds in February compared with 1,303,000 pounds in January, according to the Bureau of Census. The backlog of orders for commercial castings represented less than one month's shipments at the February rate of activity.

Zinc—Marginal producers in the Tri-State district still claim they need subsidy legislation or an advance in prices in order to step up production to meet current heavy demands. Volume of business in both the domestic and export markets is limited by the present production rate. Moderate business is being done in the export market at 12.50c, fas Gulf ports. The domestic market held firm at 12.00c, East St. Louis, for prime western.

Tin—Reconstruction Finance Corp. has purchased about 500 tons of Chinese tin of 99 per cent grade and an undisclosed tonnage to Siamese tin, bringing the total of the latter to 1480 tons, some of which may qualify at Grade A. RFC's purchases now total 13,100 tons against the 17,850 tons allocated to the United States for the first half of 1948.

International Tin Study Group, following its second meeting in Washington, issued an estimate of world mine production of tin at 150,000 long tons for 1948, 170,000 tons for 1949, and 200,000 tons for 1950. These figures were smaller than those estimated at the 1947 meeting. These reduced estimates reflected difficulties faced in rehabilitating the Far Eastern tin mines, and some reduction in the tonnages estimated from other sources. The potential industrial consumption of tin was estimated at 190,000 tons for 1948, 1949 and 1950 annually.

Demand for Aluminum Tends Upward

Pittsburgh—Possible allocation of aluminum to meet the indicated substantial increase in requirements under the pending expansion in production of military aircraft has resulted in a definite upturn in demand to cover civilian end uses.

However, until the augmented aircraft program has crystallized, it is impossible to estimate aluminum requirements involved and, consequently, the extent, if any, allocations will be necessary. Some military inquiries have been received, but to date these have not reached the firm order stage.

Current deliveries of aluminum sheets are extended 60 to 90 days. One producer reports some progress is being made against order backlogs, despite restricted finishing mill operations due to the shortage of aluminum ingot. However, this view is not confirmed by many consumers who contend they are unable to obtain firm delivery promises on new orders, while delivery promises on previous commitments have been revised repeatedly to later dates. Some dealers state their allocations have been cut back up to 25 per cent. It is pointed out that distribution of aluminum has been given preference to permanent customers. Those end uses that are of obvious substitution character because of the critical sheet steel shortage, for example, have been the first to be cut back.

Scarcity of aluminum ingots, rather than inadequate finishing capacity, is the major bottleneck in the aluminum supply. Shortage of hydroelectric power in the South due to droughts, has limited aluminum ingot production for months. To meet this situation, Aluminum Co. of America is giving serious consideration to establishment of a reduction plant where primary aluminum may be produced by using electricity generated with natural gas as the fuel.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted.)

Copper: Electrolytic, 21.50c, Conn.; Lake, 21.62½c, Conn.

Brass Ingot: 85-5-5-5 (No. 115) 19.25c; 88-10-2 (No. 215) 28.00c; 80-10-10 (No. 305) 24.25c; No. 1 yellow (No. 405) 15.25-16.00c. Prices include 25 cents per 100 lb freight allowance.

Zinc: Prime western 12.00c, brass special 12.25c, intermediate 12.50c, East St. Louis; high grade 13.00c, delivered.

Lead: Common 17.30-17.35c; chemical and corroding 17.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 15.00c, pigs 14.00c; metallurgical 94% min. 13.50c. Base prices for 10,000 lb and over, delivered.

Secondary Aluminum: Piston alloy (No. 122 type) 18.50-18.75c; No. 12 foundry alloy (No. 2 grade) 18.00-18.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.50-19.25c; grade 2 18.00-18.50c; grade 3, 17.75c; grade 4 17.00-17.50c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) 94.00c; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, 93.85c; grade C, 99.65-99.79%, incl., 93.50c; 99.5-99.64% 93.50c; grade F, 98-98.99% 92.60c for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American, 99-99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 33.50c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 33.75c; 25-lb pigs, 35.25c; shot, 36.25c; "F" nickel shot or ingots, for addition to cast iron, 34.25c. Prices include import duty.

Mercury: Open market, spot, New York, $75-$77 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $1.75, del.; special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 74.62½c per ounce.

Platinum: $98-$101 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$120 per troy ounce.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 22.00c; 5 tons and over 22.50c; 1 to 5 tons, 23.00c; less than 1 ton, 23.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 44.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 15.00c; 1000 to 19,900 lb, 14.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.00c; over 250 lb, 24.00c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c, 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 23.50c; 275-lb, or 500 bbls. 21.50c, fob Cleveland.

Tin Anodes: Bar, 1000 lb and over 110.00c; 500 to 999 lb, 110.50c; 200 to 499 lb, 111.00c lb, 111.00c; less than 200 lb, 112.50c; ball, 1000 lb and over, 112.25c; 500 to 999 lb. 112.75c; 200 to 499 lb, 113.25c; less than 200 lb, 114.75c, fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers and resellers, 67.4c; 100 or 300 lb drums only, 100 to 500 lb, to consumers 59.2c, to resellers 54.8c; 600 to 1900 lb, to consumers 56.8c, to resellers 52.5c; 2000 to 9900 lb, to consumers 55.0c, to resellers 50.9c; 10,000 lb or more l.c.l., to consumers 53.9c, to resellers 49.9c; carloads, to consumers 52.7c, to resellers 48.7c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 37.25c, fob Cleveland; 37.00c, Detroit; 36.00c, fob Philadelphia.

Potassium Stannate: 350 to 1050 lb, 65.00c; 1400 to 2100 lb, 62.50c; 2450 lb and more, 61.50c.

Stannous Sulphate: Less than 2000 lb, 94.00c; more than 2000 lb, 93.00c.

Stannous Chloride (anhydrous): 400 lb-bbls. 89.00c; 100-lb kegs, 90.00c per lb.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, fob mill.)

Sheet: Copper 33.68c; yellow brass 30.16c; commercial bronze, 95% 33.80c, 90% 33.27c; red brass, 85% 32.23c, 80% 31.70c; best quality 31.09c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.56c; nickel silver, 18%, 42.42c; phosphor bronze, grade A, 5%, 52.70c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.69c; commercial bronze, 95% 33.49c, 90% 32.96c; red brass, 85% 31.92c, 80% 31.39c.

Seamless Tubing: Copper 33.72c; yellow brass 32.92c; commercial bronze 90% 35.68c; red brass 85% 34.89c, 80% 34.36c.

Wire: Yellow brass 30.45c; commercial bronze, 95% 34.09c, 90% 33.56c; red brass, 85% 32.52c, 80% 31.99c; best quality brass 31.38c.

Copper Wire: Bare, soft, fob eastern mills, c.l. 26.80c, l.c.l. 27.30c; weatherproof, fob eastern mills, c.l. 27.35c, l.c.l. 27.85c; magnet, delivered, c.l. 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, l.c.l. 30.50c-31.88.

ALUMINUM

(Base prices, fob shipping point)

Sheets and Circles: 2s and 3s mill finish c.l., fob shipping point.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	24.0	...	...
0.135-0.126	12-48	24.5	...	...
0.125-0.096	12-48	24.5	23.1	26.3
0.095-0.077	12-48	25.0	23.2	26.5
0.076-0.061	12-48	25.5	23.4	26.7
0.060-0.048	12-48	25.7	23.6	27.0
0.047-0.038	12-48	26.1	23.8	27.3
0.037-0.030	12-48	26.4	24.1	27.7
0.029-0.024	12-48	26.8	24.4	28.1
0.023-0.019	12-36	27.4	24.8	28.6
0.018-0.017	12-36	27.9	25.3	29.3
0.016-0.015	12-36	28.6	25.9	30.1
0.014	12-24	29.4	26.6	31.1
0.013-0.012	12-24	30.2	27.3	32.0
0.011	12-24	31.1	28.1	33.1
0.010-0.0095	12-24	32.1	29.0	34.3
0.009-0.0085	12-20	33.2	30.0	35.7
0.008-0.0075	12-20	34.4	31.1	37.1
0.007	12-18	35.7	32.3	38.8
0.006	12-18	37.0	33.5	42.6

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh)

Sheets: Full rolls, 140 sq ft or more, $20.85 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. Pipe: Full coils, $20.10 per cwt; cut coils, $20.35. Traps and Bends: List price plus 52%.

ZINC

Sheet, 16.50c-17.00c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 15.25c-16.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 14.25c; over 12-in., 15.25c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 54.00c. Strip, cold-rolled, 60.00c. Rods, hot-rolled 50.00c, cold-finished 55.00c. Angles, hot-rolled, 50.00c. Plates, 52.00c. Seamless tubes, 83.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 43.00c; No. 35, 41.00c. Strip, cold-rolled, 44.00c. Rods, hot-rolled 39.00c; cold-finished 44.00c. Angles, hot-rolled, 39.00c. Plates, 41.00c. Seamless tubes, 71.00c. Shot and blocks, 31.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.625	15.375	14.750
Commercial Bronze			
95%	18.125	17.875	17.375
90%	17.625	17.375	16.875
Red brass			
85%	17.500	17.250	16.750
80%	17.250	17.000	16.500
Best Quality (71-79%)	16.625	16.375	15.875
Muntz Metal	14.750	14.500	14.000
Nickel silver, 5%	16.500	16.250	8.250
Phos. bronze, A. B.	20.750	20.500	19.500
Naval brass	15.250	15.000	14.500
Manganese bronze	15.250	15.000	14.375

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.50, No. 2 copper 17.50, light copper 16.50, composition red brass 15.25, auto radiators 12.25, heavy yellow brass 11.25, brass pipe, 12.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 19.00, No. 2 copper 18.00, light copper, 17.00, refinery brass (60% copper), per dry copper content 17.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.75-17.00, No. 2 15.75-16.25, light copper 14.75-15.00, No. 1 composition red brass 13.25-13.75, No. 1 composition turnings 12.75-13.25, mixed brass turnings 8.00-8.25, new brass clippings 12.50-13.00, No. 1 brass rod turnings 10.00-10.50, light brass 7.00-7.50, heavy yellow brass 9.50-10.00, new brass rod ends 10.50-11.00, auto radiators, unsweated 10.25-10.75, cocks and faucets 10.50-11.00, brass pipe 10.50-11.00.

Lead: Heavy 15.00-15.25, battery plates 9.25, linotype and stereotype 16.00-16.50, electrotype 13.50-14.00, mixed babbitt 14.25-14.75, solder joints, 17.25-17.75.

Zinc: Old zinc 5.50-5.75; new die cast scrap 4.75-5.25, old die cast scrap 2.75-3.25.

Tin: No. 1 pewter 60.00-62.00, block tin pipe 77.00-78.00, auto babbitt 46.50-47.00, No. 1 babbitt 46.50-48.00, siphon tops 45.00-47.00.

Aluminum: Clippings 2S 9.50-10.00, old sheets 7.50-8.00, crankcases 7.50-8.00, borings and turnings 3.00-3.50, pistons, free of struts, 7.50-8.00.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
March Average:	21.500	14.825	12.000	94.000	15.000	33.000	33.750	74.625
Apr. 1-3	21.500	14.80-14.85	12.000	94.000	15.000	33.000	33.750	74.625
Apr. 5-29	21.500	17.30-17.35	12.000	94.000	15.000	33.000	33.750	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Busheling	40.00-40.50*
Nos. 1, 2 & 3 Bundles	40.00-40.50*
Machine Shop Turnings	36.00-36.50
Mixed Borings, Turnings	36.00-36.50
Short Shovel Turnings.	36.50-37.50
Cast Iron Borings	36.00-37.00
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Heavy Turnings	40.50-41.00

Cast Iron Grades

No. 1 Cupola	65.50-66.50
Charging Box Cast	48.00-49.00
Heavy Breakable Cast.	48.00-49.00
Unstripped Motor Blocks	52.00-53.00
Malleable	69.00-70.00
Brake Shoe	52.00-53.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	75.00-80.00
Axles	51.50-52.00
Rails, Rerolling	56.00-57.00
Rails, Random Lengths	60.00-61.00
Rails, 3 ft and under	61.50-62.00
Rails, 18 in. and under	62.50-63.50
Railroad Specialties	54.00-55.00
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	46.00-49.00

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	67.00-69.00
Charging Box Cast	58.00-60.00
Stove Plate	58.00-60.00
Heavy Breakable Cast.	54.00-56.00
Unstripped Motor Blocks	58.00-60.00
Malleable	73.00-78.00
Brake Shoes	52.00-53.00
Clean Auto Cast	68.00-70.00
No. 1 Wheels	58.00-60.00
Burnt Cast	56.00-57.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	73.00-78.00
Rails, Rerolling	57.00-58.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under	61.00-63.00
Cast Steel	56.00-58.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	57.00-59.00

* Plus applicable freight springboard.

VALLEY

No. 1 Heavy Melt. Steel	$40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings.	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	46.00-47.50

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$35.00-35.50
Short Shovel Turnings.	37.00-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings.	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast.	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50
R.R. Malleable	68.00
Rails, Rerolling	53.00
Rails, Random Lengths	50.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings.	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	40.00-40.50

Cast Iron Grades

No. 1 Cupola Cast	58.00-60.00
Heavy Breakable Cast.	48.00-50.00
Clean Auto Cast	60.00-62.00

BUFFALO

No. 1 Heavy Melt. Steel	$42.00-44.00
No. 2 Heavy Melt. Steel	39.75-40.25
No. 1 Busheling	39.75-40.25
No. 1 & 2 Bundles	39.75-40.25
Machine Shop Turnings	34.75-35.25
Mixed Borings, Turnings	34.75-35.25
Cast Iron Borings	35.50-36.00
Short Shovel Turnings.	35.50-36.00
Low Phos.	46.00-47.00

Cast Iron Grades

No. 1 Cupola	66.00-67.00
Mixed Cupola	63.00-65.00
Heavy Breakable Cast.	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under.	56.00-58.00
Railroad Specialties	52.00-53.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$41.50-42.50
No. 2 Heavy Melt. Steel	39.00
No. 1 Busheling	39.00
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Machine Shop Turnings	34.00-35.00
Mixed Borings, Turnings	34.00-35.00
Short Shovel Turnings.	34.00-35.00
Bar Crop and Plate	47.00-48.00
Punchings & Plate Scrap	47.00-48.00
Cut Structurals	47.00-48.00
Elec. Furnace Bundles.	43.50-44.50
Heavy Turnings	42.50-43.00
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola Cast	62.00-64.00
No. 1 Machinery Cast	66.00-67.00
Charging Box Cast	61.00-62.00
Heavy Breakable Cast.	61.00-62.00
Unstripped Motor Blocks	59.50
Malleable	74.00-76.00
Clean Auto Cast	62.00
No. 1 Wheels	67.00-68.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.03
No. 2 Heavy Melt. Steel	34.03
No. 1 Busheling	34.03
Nos. 1 & 2 Bundles	34.03
No. 3 Bundles	32.03
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings.	30.50-31.00
Punchings & Plate Scrap	40.00-41.00
Cut Structurals	40.00-41.00
Elec. Furnace Bundles.	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	54.00-56.00
Charging Box Cast	54.00-55.00
Heavy Breakable	54.00-55.00
Unstripped Motor Blocks	51.00-53.00
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.40-31.90
No. 2 Heavy Melt. Steel	31.40-31.90
No. 1 Bundles	31.40-31.90
No. 1 Busheling	31.40-31.90
Machine Shop Turnings	26.90
Mixed Borings, Turnings	26.90
Short Shovel Turnings.	28.90
Bar Crops and Plate	35.00-37.00
Punchings & Plate Scrap	35.00-37.00
Chemical Borings	34.00-35.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-60.00
Heavy Breakable Cast.	50.00-53.00
Stove Plate	52.00-55.00
Unstripped Motor Blocks	48.00-49.00
Clean Auto Cast	48.00-50.00

CHICAGO

No. 1 Heavy Melt. Steel	$39.00-39.50
No. 2 Heavy Melt. Steel	39.00-39.50
No. 1 Bundles	39.00-39.50
No. 2 Bundles	39.00-39.50
No. 3 Bundles	37.00-37.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings.	36.00-36.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	46.50-47.00
Punchings	48.00-48.50
Elec. Furnace Bundles.	40.00-40.50
Heavy Turnings	38.50-39.00
Cut Structurals	44.00-44.50

Cast Iron Grades

No. 1 Cupola Cast	68.00-70.00
Clean Auto Cast	68.00-70.00
No. 1 Wheels	58.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.25-41.75
Malleable	74.00-77.00
Rails, Rerolling	49.00-50.00
Rails, Random Lengths	48.00-49.00
Rails, 3 ft and under.	55.00-56.00
Rails, 18 in. and under	57.00-58.00
Railroad Specialties	49.00-50.00
Angles, Splice Bars	51.00-52.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.50-40.50
No. 2 Heavy Melt. Steel	37.50-38.50
Machine Shop Turnings	32.50-33.50
Short Shovel Turnings.	34.50-35.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-67.00
Mixed Cast	60.00-62.00
Heavy Breakable Cast.	55.00-56.00
Brake Shoes	54.00-55.00
Clean Auto Cast	65.00-67.00
Burnt Cast	58.00-59.00

Railroad Scrap

R. R. Malleable	65.00-70.00
Rails, Rerolling	50.50-52.50
Rails, Random Lengths	49.50-51.50
Rails, 3 ft and under	53.00-55.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	48.00-50.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	40.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Length.	45.00-48.00
Rails, 3 ft and under	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	26.00
No. 1 Busheling	26.00
Nos. 1 & 2 Bundles	22.00-23.00
No. 3 Bundles	22.00-23.00
Machine Shop Turnings	14.50-16.50
Mixed Borings, Turnings	14.50-16.50
Punchings & Plate Scrap	26.00-28.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	40.00
Charging Box Cast	25.00
Heavy Breakable Cast.	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

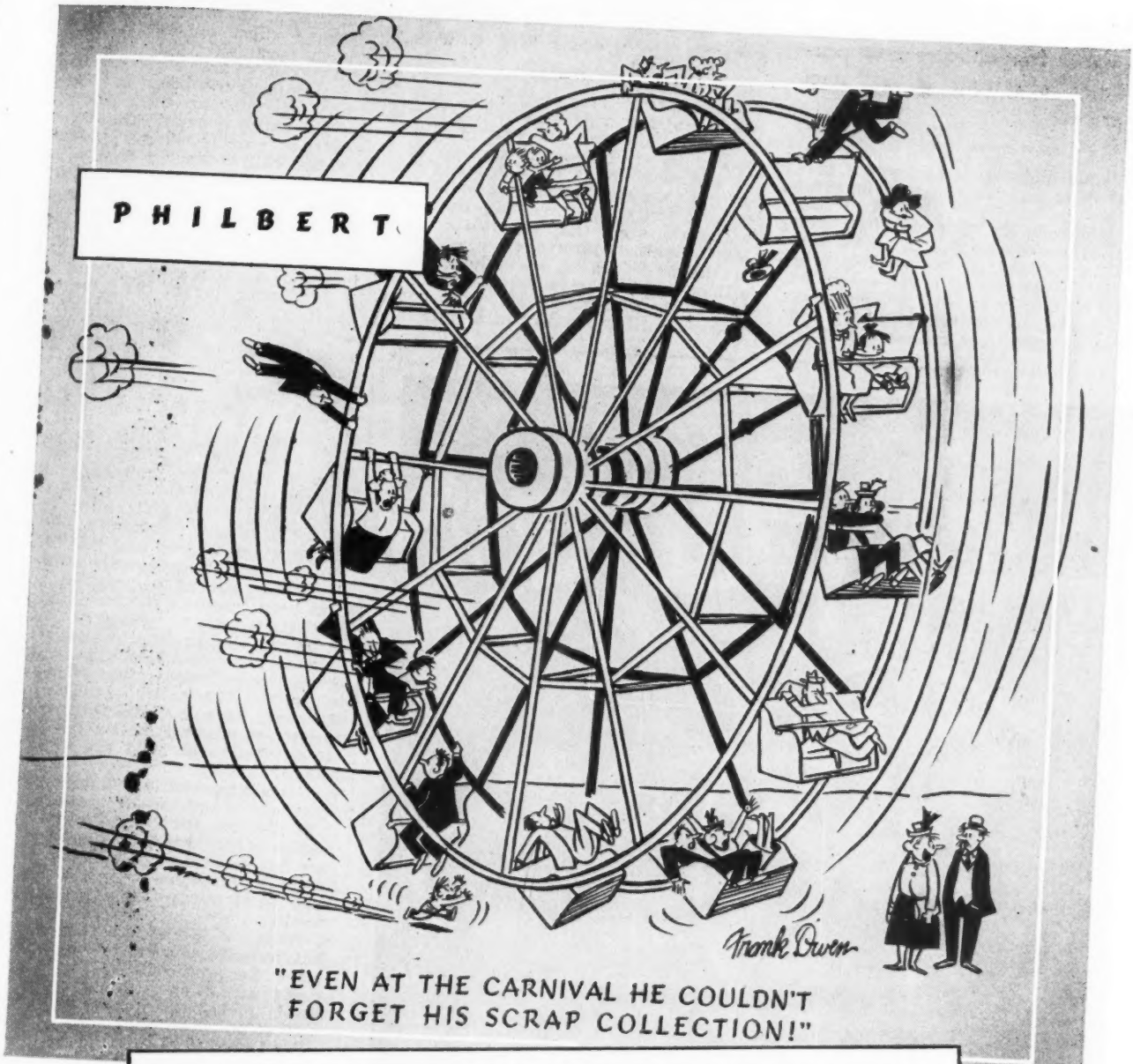
(Ceiling prices, delivered)

Heavy Melt.	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	28.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-48.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Sheets, Strip . . .

Higher freight rates seen partially offsetting lower steel prices

Sheet Prices, Page 154

Philadelphia—It may require several days for the situation in sheet prices to clarify. Several of the larger producers have indicated they will make concessions in prices following the lead of the principal producer in setting up lower schedules May 1. Others haven't yet definitely committed themselves, but they are the exception rather than the rule. Consumers will not reap the full benefit of such reductions for the reason that interstate freight rates are scheduled to advance May 6, with the likelihood that most intrastate rates will be increased correspondingly at that time. This further increase, which applies in general to territory north of Ohio river and east of Mississippi river, represents a jump of 30 per cent over a year ago and is causing eastern seaboard consumers concern lest inland producers further withdraw rather than absorb the extra freight. Third quarter quotas are being set up on a smaller scale, although due principally to tonnage lost by the mills as a result of recent coal strike and prospect of a further loss in third quarter because of vacations. Quotas are tentative, for reason that producers are still not able to gage effect of defense program and European aid requirements. Certain producers are proceeding on only a month-to-month basis, but the majority are making their allotments for the entire quarter. One seller of electrical sheets has set quotas up for the entire quarter on the same basis as for the current quarter.

New York — While indications are that most sheet producers will follow the lead of the principal seller in reducing prices, the subject is still being studied. It may be several days, if not longer, before the situation is clarified. Some producers have not as yet even entered negotiations seriously with their unions and much will depend, they claim, upon what decision is made with regard to wages before they can settle upon a price policy.

At least one producer has opened books for July, with indications that it will have little tonnage available for the rank and file of its customers. Only carbuilders and railroads are likely to receive tonnage in anything like regular volume and this will be due to commitments made under the voluntary allocation program which has been in effect for some time.

Certain other producers believe they will be in position to set up quotas on at least a tentative basis very promptly, most of them for the entire three months. However, there are at least two large producers who will not be in position to act before at least the middle of May.

Certain specialties, including particularly stainless sheets and strip, are the exception, insofar as quota action is concerned, as these products are not sold on a quarterly or even a monthly quota basis. Delivery promises on stainless range from 8 to 12 weeks.

Boston — Slightly lower steel costs, but no improvement in supply, is in store for a substantial number of users of light consumer grades of steel, including narrow cold-rolled and some wire products. Nonintegrated producers are squeezed in the price reduction in view of increases in semifinished steel prices earlier this year. At that time, the rise in hot strip and rods was not general. They must, however, adjust prices on finished steel, if competition is to be met. As a matter of fact, the steel supply situation is such that present prices could be maintained until corrected without too much resistance on the part of many consumers. This has been true of some premium priced steel for months, or through the postwar period, notably plates. Long-established policy and future trade relationships will be a factor in final pricing decisions by nonintegrated and other producers in view of reduction by the largest producer.

Pittsburgh — Some sellers doubt ability to reduce galvanized sheet prices in line with cuts by U. S. Steel Corp., since they are losing money on this item. Profit margin on electrical and enameling sheets is small and significant reductions would force these items into the unprofitable group. A number of integrated producers have indicated no price reduction is possible at this time.

Cleveland—Demand for sheets and

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strip continues unabated. In an effort to keep production as high as possible, Republic Steel Corp. will suspend rolling mill operations two weeks in July for employee vacations. This is in contrast to a previous plan of staggering vacations over the summer months. The company believes the net reduction of finished steel output will be less with the simultaneous vacation plan than with the program of staggering vacations. Since steelmaking will continue during the rolling mill vacation period, the company will have an opportunity to accumulate ingots for sustaining a high rate of rolling mill operations after vacations. All of the company's rolling mills, however, will not necessarily be closed during the same two weeks in July.

Birmingham — Sheet users have adopted more or less a policy of watchful waiting with quotas uncertain and demand remaining greatly in excess of production. Discouragement generally is evident among sheet users, especially since the recent loss in production occasioned by the coal strike. No material improvement in the overall picture is anticipated before late this year.

Steel Bars . . .

Bar Prices, Page 154

New York—Outlook in hot carbon bar prices is for continued steadiness, except for what revisions may be necessary in the delivered prices as a result of the advance in freight rates May 6. Actually, insofar as delivered prices here are concerned, there may be no change until later inasmuch as Buffalo is the governing base point and it is possible there may be delay in putting the intrastate rate into operation.

However, the prospect for no early changes in delivered prices, other than those occasioned by the freight increase, is predicated on the stabilizing influence exerted on the entire market by the May 1 revision in prices of certain products by several leading sellers.

Quotas for third quarter are now being set up on a lighter basis than those announced for current quarter. The coal strike will result in heavy arrearages at the end of this quarter, and there will be a production lag in the next quarter, particularly in July, due to vacations. Defense work by that time also will have been stepped up. Actually the defense program is not being taken greatly into account at this time, for it has not advanced to a point where the mills know what to expect. They anticipate a stepping up in needs, and are probably making some allowances in setting up tentative quotas.

Cold-drawn carbon bar orders are becoming more extended, with some producers having little to offer before August; sizes 5/16-inch and under, little before November. Stringency is particularly noticeable in small flats. Hot and cold alloy bar promises average late July and August.

Boston — Carbon steel bars are tightening on more grades and sizes, while open-hearth alloys are more extended. There is talk of resuming allocations of cold-drawn bars for the fourth quarter. Most users of bars, including screw machine parts makers, forge shops and bolts and nuts producers, are maintaining operations at a steady rate, but are handicapped by lack of inventory balance. Demand for flats, four-inch and larger, is notably strong. Stocks of cold-drawn bars are ample at some points, but this reflects in part earlier tie-in sales or selective selling. Some of the recent lift in alloy volume is traceable to producers of aircraft parts. The planned boost in aircraft assembly lines eventually means a scramble for parts subcontractors and a still heavier call for alloys.

Philadelphia — In making hot carbon bar allotments for third quarter, most producers are allowing for a carryover of a month to six weeks' production and, in general, quotas will be down from the current period. Moreover, allotments are largely tentative, as the question of domestic priority needs and the requirements for European aid has not been clarified.

Wire . . .

Wire Prices, Page 155

Birmingham—Wire output jumped from a very small volume to approximately normal last week. But that means nothing as far as balancing supply with demand is concerned. July quotas may be eliminated due to the slack occasioned by the strike in coal.

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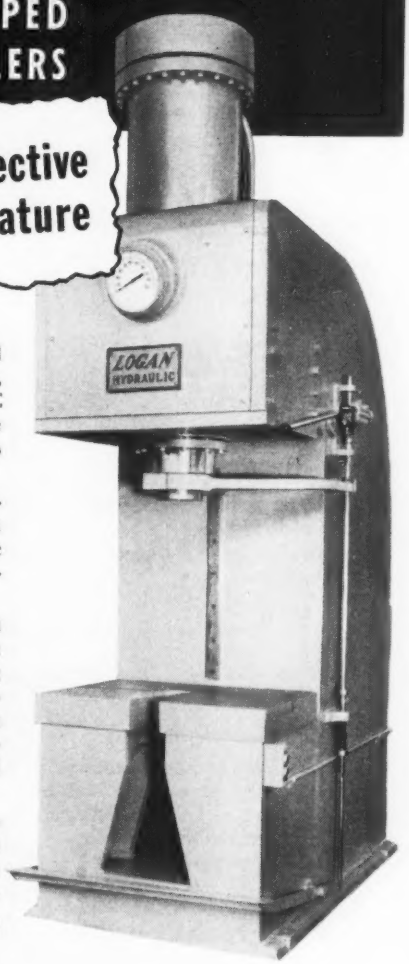

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- **STRAIGHT BEVEL.** Sizes from 16 pitch, 1½" dia. (approx.), to 1½ pitch, 28" dia., (approx.).
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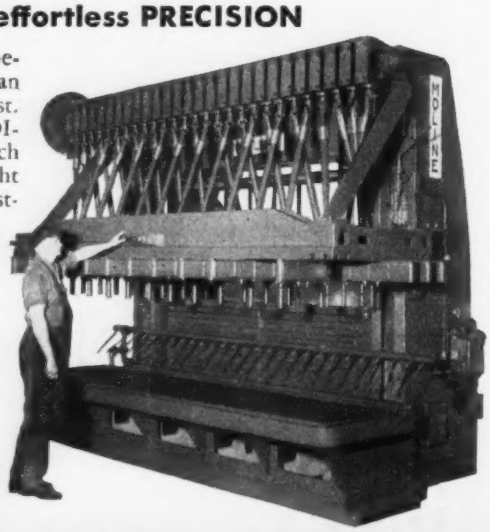

No. HU68 DRILLER

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MOLINE TOOL COMPANY
100 20th Street Moline, Illinois

Inland Revises Detroit Delivered Price Schedule

Chicago—Inland Steel Co., this city, has raised its delivered prices in the Michigan district to levels in line with those put into effect recently by Great Lakes Steel Corp., Detroit, and Armco Steel Corp., Middletown, O. Inland has informed its customers that effective on shipments made on and after Apr. 26, its delivered prices in carload quantities at stated points will be as follows in dollars per 100 pounds:

	Detroit	Toledo, O., & Eastern Mich.
Sheets		
Hot-Rolled, 18G & hvr.	$3.01	$3.08
Cold-Rolled	3.76	3.83
Enameling Iron	4.16	4.23
Strip		
Hot-Rolled	3.01	3.08
Cold-Rolled	3.76	3.83
Bars, Hot-Rolled Carbon (exclusive of bar shapes)	3.11	3.18

The principal cities in eastern Michigan to which the above revised prices apply include Adrian, Albion, Ann Arbor, Battle Creek, Charlotte, Flint, Jackson, Lansing, Lapeer, Marshall, Owosso, Pontiac, Richmond, South Lyon, Sturgis, Wyandotte, and Ypsilanti.

Plates . . .

Plate Prices, Page 155

New York — As plates were not mentioned by the leading producer as being subject to any revision in price at this time, the general outlook is for continued steadiness, except for such changes as may be necessary in delivered prices as will result from the increase in freight rates, effective, on interstate traffic at least, May 6.

Mills are beginning to at least partially open books for third quarter. They are at least setting up tentative quotas which are smaller than those for the current period. Arrearages at the end of this quarter will be substantially heavier than those carried over Apr. 1.

Atlantic, Gulf and West Indies Steamship Lines are negotiating with the Maritime Commission for the construction of at least three combination passenger and deep cargo vessels. One of the projected ships will approximate 12,000 gross tons, with the remaining two somewhat smaller.

Philadelphia—Apart from advances due to higher freight rates, scheduled to go into effect this week, delivered prices on plates are likely to continue unchanged. Leading steel producers, who recently announced their intention of reducing prices on several products, have not included plates and there appears little probability that others, whose production is confined principally to plates, will make any reduction. In fact, most of the smaller independent plate mills have long since been quoting premiums. Meanwhile, producers are setting up allotments for third quarter on a reduced scale.

Birmingham — Plate producers are falling still further behind on schedules. Improved production is at hand, but carryovers are large and the needs of the car-building industry and shop repair program in this section are great. Warehouses, especially, are

able to stock but a comparative handful of plates. Small users are finding it difficult to have their supplies met.

Seattle — Shortage of plates is hampering shop operations, some plants running half crews, although there is sufficient potential work to warrant full operations. Under the circumstances, owners cannot perfect future plans and are unable to bid on larger contracts. Mill allocations have been tightened and deliveries extended, both plates and sheets being critical.

Structural Shapes . . .

Structural Shape Prices, Page 155

New York — Outstanding among recent structural awards is a 10,000-ton contract for a 37-story loft building at 1407 Broadway, placed with Bethlehem Steel Co. This is one of several contracts to have been placed recently, involving 1000 tons or over.

Shape mill production is being stepped up following the recent curtailment resulting from the coal strike, but normal operations are not expected for at least another week or ten days. Meanwhile, no change is in sight with respect to base prices on shapes. No change was indicated in this product by the leading producer in connection with announced reduction on various products May 1. However, delivered prices on shapes will reflect the proposed increase in freight rates, effective May 6.

Estimated structural bookings in March amounted to 215,884 tons, according to the American Institute of Steel Construction Inc., the largest monthly total since January, 1946. This figure represents an increase of 44 per cent over the 149,634 tons booked in March, 1947, and 73 per cent over the same averaged month in the five prewar years, 1936-1940.

With totals for January and February revised to 160,390 and 129,382 tons, respectively, the first quarter total amounts to 505,556 tons compared with 328,416 for the average period during 1936-1940.

March shipments totaled 158,133, a 15 per cent increase over March, 1947, and 37 per cent over the averaged month in the five prewar years. With January and February shipments revised to 145,230 and 137,760 tons, respectively, shipments during the first quarter amounted to 441,-123 tons, against 296,235 tons in the averaged period for the five prewar years.

Tonnage available for fabrication within the next four months only is 596,886 tons.

Philadelphia — While no change in base price of shapes is expected to develop as a result of reductions now being made on light products, delivered prices will reflect the new temporary freight rate increase effective on interstate traffic May 6 and probably on Pennsylvania intrastate rates on that date or shortly thereafter. The new rates will represent an increase in official classification territory of 30 per cent over the rates in effect a year ago. Structural awards are light, although several fair-sized projects are active.

Seattle — Fabricators are seriously handicapped by material shortages, the situation being aggravated by the recent eastern coal strike, resulting in decreased allocations and deferred deliveries. Shop operations are tuned to existing supplies and management is buying all materials possible from coast producers. Inventories are practically nil and no immediate relief is in sight. There is a good volume of small orders, management hesitating to commit itself on large projects.

Tin Plate . . .

Tin Plate Prices, Page 155

Pittsburgh — Reduction in tin tin plate prices is expected to be passed on to packers in the form of a price reduction for tin containers. American Can Co. last week notified its branch offices to this effect. The last time tin plate prices were reduced was on Nov. 10, 1938, when hot-dipped tin plate was cut 10 cents per base box to $5. Some trade authorities believe that despite possible higher pig tin cost, the effect of a reduction in tin plate prices will be softened because of the definite trend toward greater use of electrolytic. Tin plate producers' contracts with can companies stipulate that any reduction in prices during the year can be reinstated should sellers so desire in light of increased production costs. However, in view of Mr. Fairless' statement that no price increase will be put into effect on any

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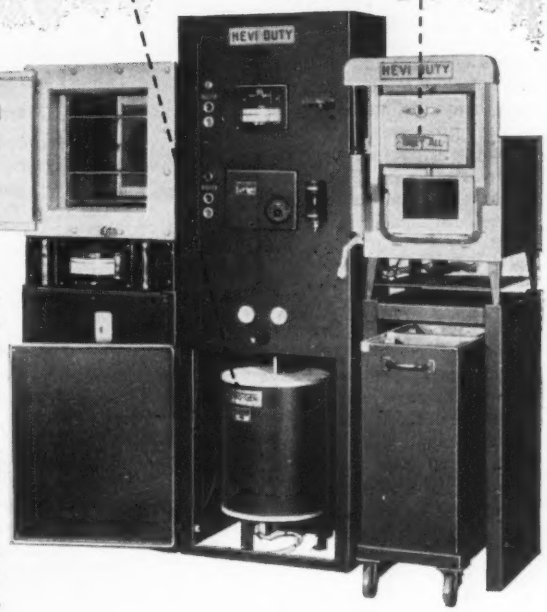

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of the company's products, such action is seen highly improbable for the remainder of this year.

The tin supply outlook is not as bright for 1948 and 1949 as previously indicated. Estimated tin demand is expected to range around 190,000 long tons a year for 1948, 1949 and 1950, if the metal were freely available. In contrast to this estimated demand, indicated production this year will amount to 150,000 long tons, 170,000 tons in 1949, and 200,000 tons in 1950. This estimated annual production schedule is substantially less than previously estimated for 1948 and 1949, reflecting difficulty in getting the Netherlands Indies tin mines into prewar production.

Shortage of Steel Acute In Cincinnati District

Cincinnati — A number of metalworking plants in this area, who had been running on hand-to-mouth shipments of steel, have been forced to curtail. An Ohio river flood imposed itself on the coal mine shutdowns, reducing ingot production by one-half for more than a week. Barge shipments of steel to warehouses, and coal to coke ovens were suspended. Several important jobbers, located on the river front, were out of the market. Shortage of steel, by the combination of factors, has recently been more pronounced than at any time in the postwar period.

Warehouse . . .

Warehouse Prices, Page 157

Philadelphia — Jobbers plan to advance prices this week so as to cover the increase in freight rates, scheduled to become effective May 6 on interstate rates, then later revise light products so as to conform with mill reductions now being announced, with the leading producer's changes becoming effective May 1. Meanwhile business is active with some distributors reporting that April trading actually exceeded March, despite the coal strike. They are less optimistic about May, however, believing the full effect of the recent disruption will probably fall hardest in the current month.

Pittsburgh — No consistent policy among steel distributors is expected in reducing prices following downward revisions by certain integrated steel producers. It is not definite all integrated producers will put into effect similar price reductions, while it is pointed out the warehouse price spread generally has remained unchanged since prewar despite rising operating costs. If price reductions are put into effect on cold-finished bars, steel distributors undoubtedly would follow for their prices are on a mill parity for small lot tonnages. Similar action is indicated on such items as wire and pipe involving an established percentage markup.

Department of Commerce is expected to select a steel distributor Advisory Committee from the names submitted to the agency on Apr. 21. It is expected that such a group will be in a position to rapidly go into action in event the steel industry is forced to accept much more widespread directive distribution of its output.

Cincinnati — Supplies of steel from warehouses have been disrupted by curtailed shipments from mills and by effects on some interests by an Ohio river flood, which has now receded. Shortages are acute.

Los Angeles — Reaction to the announced price cuts has not crystalized here. Consumers, as well as branches of parent companies, are awaiting definite information on the planned reductions on specific products.

Warehouses point out that the new freight rates which go into effect May 6 probably will offset the price cuts. Therefore, suppliers in general feel that these two actions will result in negligible reductions in prices to consumers.

Seattle — Jobbing houses report June shipments of plates and sheets, stocks of which are already critically low, will be decreased by 60 per cent according to mill notices. Monthly deliveries of some items will be entirely eliminated, due to interrupted production at eastern plants. Demand for all out-of-stock items is strong, although stocks are badly broken. Bars and shapes are in fair supply, coming largely from coast mills. Deliveries of alloys and cold-finished products are slowing.

Tubular Goods . . .

Tubular Goods Prices, Page 155

Cleveland — Resumption this week of buttweld pipe production, cut off entirely for about a month at Republic Steel Corp.'s mill at Youngstown as result of the coal miners' strike, is hoped for. Electric weld pipe output has continued, but on a reduced scale. Demand for pipe has not diminished, and the recent interruption to production intensifies pressure for deliveries.

Seattle — Cast iron tubular goods are in good demand but deferred deliveries of 24 months or more are a serious handicap. Where quick action is necessary, bids as a rule include alternatives.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 154

Seattle — While rolling mills are holding reinforcing bar backlogs at reasonable levels, it is impossible to accept all business being offered. There is a large volume in small tonnages of less than 100 tons each involved in industrial buildings, schools and general construction. Public works jobs as a rule call for larger quantities, such as the Hungry Horse dam in Montana where steel deliveries will be staggered over the next two or three years.

Rails, Cars . . .

Track Material Prices, Page 155

New York — Car buying was slack last week, with indications that total awards for the month just ended will be down from March.

Seattle — In addition to 9000 tons tie plates recently awarded Bethlehem Pacific Steel Corp., Seattle, the Alaska Railroad has placed with the same producer contracts for 1200 tons spikes and 300 tons or more bolts.

Pig Iron . . .

Pig Iron Prices, Page 156

Pittsburgh — A number of foundries have been forced down due to the depleted stocks of both iron and coke, while some additional foundries are expected to take similar action this week. Increase in iron ore prices of 65 cents a ton have raised pig iron production costs about $1.50 a ton and, according to some sellers, higher prices are warranted. By the close of last week all blast furnaces in this area that had been banked because of the coal shortage had returned to normal operations, making a total of 43 out of 46 units pouring iron. No definite decision has yet been reached in regard to whether or not pig iron sellers will be asked to meet preferred tonnage directives for key industrial groups other than tonnage already involved for the railroad car program.

New York — Pig iron production is increasing slowly. There has been a disposition to first see the coal coming into the ovens before moving very rapidly toward getting pig iron production back to where it was. From now on, however, improvement in pig iron output should be more pronounced. Another week or so should see production fairly normal. Meanwhile district foundries are reporting better supply of coke as well as pig iron, although there will still be some delay among these consumers in getting operations back to where they were before the strike. One large Brooklyn foundry has been forced to close down entirely and may not resume for several days.

Philadelphia — Pig iron consumers report a somewhat better flow of iron and coke, but still find it impossible to attain anywhere near normal operations. Some foundries are planning to suspend operations this week, or at least for a few days, so as to build up raw material inventories and at the same time take in the National Convention and Exhibition of AFA here.

Cleveland — Pig iron production at Republic Steel Corp. was rising last week over the reduced rate necessitated by the recent disruption in coal mining, but one furnace of American Steel & Wire Co. is still down for relining. However, effects of the coal strike will be felt for some time. Meanwhile, foundries will have little or no opportunity to build up iron inventories but will be concerned principally with getting enough iron for current operations. Republic's pig iron price, based on steel scrap prices at Cleveland and Buffalo, was unchanged last week.

Buffalo — Bond plant of American Radiator & Standard Sanitary Corp. plans to resume casting operations. The plant, one of the leading iron melters in the area, suspended about a month ago because of a coke shortage. The subsidiary Tonawanda Iron blast furnace was reported shipping its output to Radiator plants elsewhere during the shutdown. Blowing in of the fifth blast furnace at the Lackawanna plant of Bethlehem Steel lifted the district pig iron rate to 81-1/2 per cent. The overall picture of merchant pig iron is still very dim, with many small foundries unable to attain full production because of tight supplies.

Cincinnati — The foundry situa-

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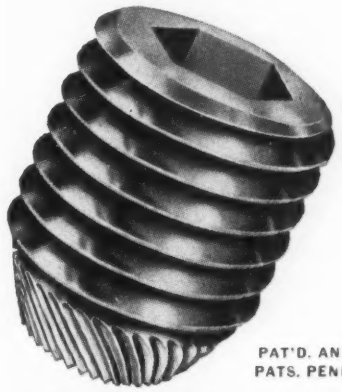

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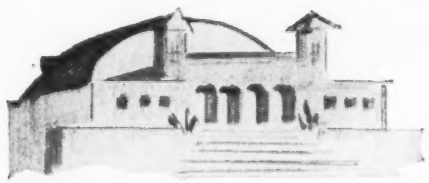

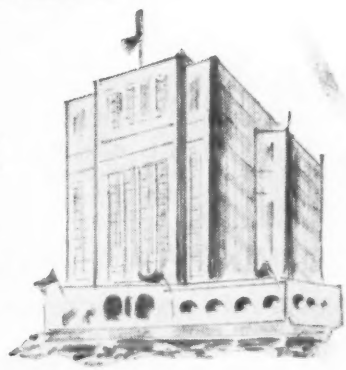

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tion, because of pig iron and coke shortages, is unimproved. Some foundries have been forced to a shutdown by failure of a coke source, and others are depending largely on scrap.

Birmingham — Even though one merchant iron melter was able to keep production at capacity during the coal strike, the shut-downs made necessary at other furnaces has served only to further tighten supplies.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 156

Pittsburgh — Pressure on coke prices continues very heavy, with a few small lot sales reported at substantially above quoted levels. However, bulk of the open market Connellsville beehive furnace coke is said to be moving within the range of $12 to $13.50 per net ton. This represents an increase of 50 cents a ton for the higher side of the range. Substantial advances in prices also have developed for New River and Wise County beehive coke.

Refractories . . .

Refractories Prices, Page 156

Pittsburgh — Producers' production schedules were disrupted during the coal strike period. Loss in refractory brick output has forced a further extension of order backlogs in some instances. Deliveries of special shape silica coke oven brick are most extended, with some interests unable to accept orders for delivery in less than six months on some specialties. In a few instances, sellers are able to make shipments from stock on standard sizes.

U. S. Steel Subsidiaries' New Prices

(*Continued from Page 56*)

Alloy plates	3.76c lb.	3.76c lb.	3.76c lb.	
Alloy structural shapes	3.51c lb.	3.51c lb.	3.51c lb.	
Alloy bar shapes	3.51c lb.		3.51c lb.	3.483c lb.
Alloy strip	4.66c lb.		4.66c lb.	4.633c lb.
Hi-strength—low alloy:				
Corten:				
Plates	4.51c lb.	4.51c lb.	4.51c lb.	
Hot-rolled sheets	4.26c lb.	4.26c lb.	4.26c lb.	4.233c lb.
Cold-rolled sheets	5.26c lb.		5.26c lb.	
Galvanized sheets	5.96c lb.			
Hot-rolled strip			4.26c lb.	4.233c lb.
Structural shapes	4.26c lb.	4.26c lb.	4.26c lb.	
C B S	4.26c lb.	4.26c lb.		
Bars and small shapes	4.41c lb.	4.41c lb.	4.41c lb.	4.383c lb.
Manten:				
Plates	4.01c lb.	4.01c lb.	4.01c lb.	
Hot-rolled sheets	3.66c lb.	3.66c lb.	3.66c lb.	3.633c lb.
Hot-rolled strip			3.66c lb.	3.633c lb.
Structural shapes	3.76c lb.	3.76c lb.	3.76c lb.	
C B S	3.76c lb.	3.76c lb.		
Bar & bar shapes	3.71c lb.	3.71c lb.	3.71c lb.	3.683c lb.
Abrasion resisting:				
Plates	4.11c lb.	4.11c lb.	4.11c lb.	
Hot-rolled sheets	3.96c lb.	3.96c lb.	3.96c lb.	3.933c lb.
Hot-rolled strip			3.96c lb.	3.933c lb.

Prices on freight car wheels will be reduced $1.00 per wheel.

TENNESSEE COAL, IRON & RAILROAD CO.

PRODUCT	BIRMINGHAM
Standard structural shapes (not including wide flange beams)	2.7875c lb.
Plates	2.9375c lb.
Hot rolled bars	2.8875c lb.
Axles	4.4875c lb.
Concrete reinforcing bars	2.7375c lb.
Hot rolled sheets—18 ga. and heavier	2.7875c lb.
Galvanized sheets	3.8875c lb.
Hot rolled strip	2.7875c lb.
Holloware enameling black plate	4.6875c lb.
Hot dipped tin plate cokes. 1.50 lb. coating (pot yield)	$6.80 per base box (freight to be added)

Prices on the following products will be decreased, reflecting average reductions in the amount indicated:

Barbed & twisted wire	$2 per ton
Wire fencing	$3 per ton
Bale ties	$5 per ton
Nails & staples	$3 per ton
Rails	$1 per ton
Joint bars	$2 per ton
Tie plates	$2 per ton
Wire	$2 per ton
All alloy steel products other than semifinished (excluding stainless)	$2 per ton

GENEVA STEEL CO.

Geneva Steel Co., Salt Lake City, Utah, eliminates a $3 differential over U. S. Steel Corp.'s eastern basing points as well as a further reduction in the selling price of hot-rolled carbon steel plates and hot-rolled carbon steel structural shapes.

Following prices apply on carload lots f.o.b. delivered within switching limits of Geneva, Utah:

Hot-rolled carbon steel plates	$2.925 per 100 lbs.
Hot-rolled carbon steel structural shapes	$2.775 per 100 lbs.

These represent a price cut of $4 a ton for these two products delivered on the Pacific Coast.

COLUMBIA STEEL CO.

Products	Los Angeles (per lb.)	San Francisco (per lb.)
Stand. structural shapes (excluding wide flange beams)	3.424c	3.4295c
Hot-rolled bars	3.579c	3.5845c
Tie plates		3.70c *
Hot-rolled sheets 18-ga. and heavier	3.494c	3.4995c
Galvanized sheets	4.624c	4.6295c
Hot-rolled strip	3.554c	3.5595c

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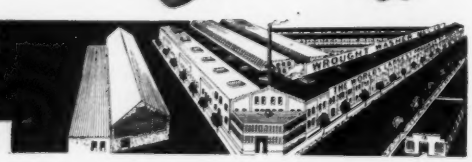

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* FOB cars, plant Pittsburg, Calif.

Prices on the following products will be decreased, reflecting average reductions in the amounts indicated:

	(Per Ton)
Wire	$2
Wire fencing	$3
Barbed & twisted wire	$2
Bale ties	$5
Nails and staples	$3
All alloy products other than semifinished (excluding stainless)	$2

Reduction will be made in certain types of wire rope in the aggregate $5 per ton.

NATIONAL TUBE CO.

National Tube Co.'s pipe and tubing price decreases vary by item but average about $3 per ton on carbon mechanical and pressure tubing and $2 per ton on alloy mechanical and pressure tubing, $2 per ton on butt-weld pipe and $1 per ton on oil country tubular goods.

AMERICAN STEEL & WIRE CO.

Product	CLEVE.	PITTS.	CHI.
C. F. bars	3.50c lb.	3.51c lb.	3.51c lb.
H. R. strip	2.80c lb.		

Prices on the following products will be decreased, reflecting average reductions in the amounts indicated:

	(Per ton)
Cold-rolled strip	$2
Wire	$2
Wire fencing (excluding chain link)	$3
Reinforcing fabric	$2
Fence posts	$3
Nails & staples	$3
Barbed & twisted wire	$2
Bale ties	$5
Screen cloth	$5
Poultry netting	$3
All alloy steel products other than semifinished (excluding stainless)	$2
Reductions will be made in certain types of wire rope reflecting, in the aggregate	$5

Delivered prices to other destinations within the United States will be quoted on request.

Prices are subject to seller's current list of extras and standard conditions of sale.

All sales are subject to seller's price in effect at time of shipment.

Scrap . . .

Scrap Prices, Page 160

Cleveland—Good weather and reduced operations recently at steel mills have improved mill inventories of scrap. However, recovery in steel production and a reduced flow of scrap as result of temporary curtailment of automaking may lower mills' scrap inventories.

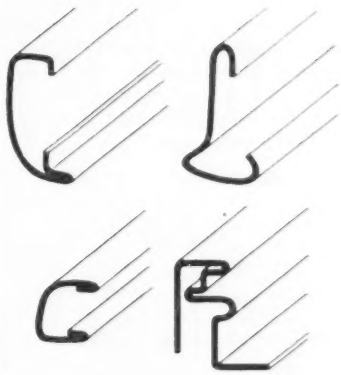
Philadelphia — Scrap prices are featured by advances in low phos grades, with bar crop and plate, punchings and plate scrap and cut structurals now holding at $47 to $48.

Canada . . .

Toronto, Ont. — Production of iron and steel products in Canada amounted to 281,052 net tons in February compared with 290,840 tons in January, and 257,556 tons in February, 1947.

Shipments made for sale in Feb-

ROLLS



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● This case history is typical of what's being reported all over the country. On light and heavy turning jobs, wherever they are used, Ideal Live Centers are raising both quantity and quality of lathe work, cutting production costs. Because they turn with the work, even on the lightest turning jobs, Ideal Live Centers eliminate all friction between work and center. There's no grabbing or gouging, no time loss for lubrication or grinding. Work is more accurate, spoilage is reduced. Deeper cuts and higher turning speeds are safely achieved. Ask for information and a free demonstration on your own work. IDEAL INDUSTRIES, Inc., Sycamore, Illinois.

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ruary included 5202 tons of semifinished shapes; 14,093 tons of structurals; 17,445 tons of plate; 19,123 tons of rails; 7976 tons of tie plates and track materials; 50,002 tons of hot-rolled bars; 12,112 tons of pipe and tubes; 15,713 tons of wire rods; 22,834 tons of black sheets; 7808 tons of galvanized sheets; 9612 tons of castings; 4395 tons of miscellaneous hot-rolled products, and 17,464 tons of all other products.

Revolutionary Changes Feared in Steel Markets

(*Concluded from Page* 55)

delivered prices, holding that in either case the same result was attained, uniform delivered prices. Some legal authorities, consequently, think the door to continued use of multiple basing point pricing has been slammed shut. The fact that the majority opinion of the Court failed to rule whether freight absorption by one individual firm without any conspiracy was illegal, which point was specifically cited in Justice Burton's dissent opinion, provides little encouragement that a loophole can be found for use of multiple basing point pricing in steel, since such freight absorption is possible only to the individual producer when he acts alone, not in concert with other interests. To prove such would be extremely difficult, the lawyers say, since past practices in the industry would be a factor to consider.

Difficult Problem—That the steel industry will be up against a difficult problem in event the multiple basing point system is banned in their industry is clear. Some observers think the steel companies may have to enlarge their present chains of warehouses if they are to continue competing for business on a national basis. Further, greater resort to truck and water transportation likely will be necessary.

As for consumers far removed from steel producing centers, they would be at a distinct disadvantage with competing manufacturing companies located close to steel mills. Migration of many of these plants would likely ensue. As for the steel industry itself, companies in producing districts now over-capacitated, such as Pittsburgh, would face an extremely difficult task of obtaining sufficient business close to their mills to keep fully occupied. In times of normal demand shifting of consumers to nearer steel mill supply sources would be likely. For instance, steelmakers at Detroit and Cleveland would have first call on Detroit automotive tonnage, a considerable part of which now goes to mills at Pittsburgh, Middletown, Chicago, and elsewhere.

Legislative Action—The Cement decision has stimulated interest in the O'Hara bill which would strip the Federal Trade Commission of all judicial powers and confine its function to prosecuting unfair competition charges in the federal courts. The House Interstate & Foreign Commerce Committee held hearings last week at which a number of representatives of business recommended enactment of the measure.

In view of the import of the Cement decision, and especially of the vast authority delegated by the Supreme Court to the FTC in holding that the latter's orders are not lightly to be dismissed by the courts, the House committee may broaden its investigation to determine what sort of legislation, if any, is necessary as a result of the Cement decision.

The major portion of the Federal Trade Commission's evidence of alleged price collusion in the steel industry now is in, according to Trial Attorney Lynn C. Paulson. He plans additional hearings over 4 days starting May 4, and 4 days starting May 25.

Then Mr. Paulson may take a short trip to the West Coast to check on conditions there; he will make a decision on this possibility during the hearings starting May 25, after he has had a chance to evaluate the record and decide whether he needs additional material to back up the commission's complaint. In any event, he now plans to complete his case no later than June. After that, counsel for the respondents will have their day. Finally, the examiner, Frank Hier, will submit his report to the commission and the commission then will decide whether to issue a cease-and-desist order.

Walter S. Tower, president, American Iron & Steel Institute, is to be recalled to the witness stand when the hearings are resumed on May 4. Whether other witnesses will be called will depend on Mr. Hier's ruling as to the admissability of the steel company price data.

That the FTC will issue a cease-and-desist order against the steel industry is regarded as a foregone conclusion in view of its issuance of such an order April 29 against 37 corporations that sell refractory brick and refractory products. The refractory order (see p. 57, this issue) takes into consideration the same factors which its attorney has sought to develop in the steel case, namely, the use of a freight-equalization, delivered-price system with standard extras.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

10,000 tons, 37-story loft building, 1407 Broadway, New York, to Bethlehem Steel Co.

8000 tons, office building, 100 Park Ave., New York, through George A. Fuller & Co., to Bethlehem Steel Co.

5800 tons, building addition, Metropolitan Life Insurance Co., 24th St., New York, through Starrett Bros. & Eken Inc., that city, to American Bridge Co., Pittsburgh.

2250 tons, transmission line, spec. 2115, Kingman, Ariz., for Bureau of Reclamation, to Bethlehem Pacific Coast Steel Corp., San Francisco.

1320 tons, addition, Idlewild Airport, Port of New York Authority, New York, to American Bridge Co., Pittsburgh.

1300 tons, apartment, Fifth Ave. and 76th St., New York, through Emery Roth & Sons, to Harris Structural Steel Co., New York.

1100 tons, Westchester viaduct and grade crossing, New York, to Bethlehem Steel Co.

1000 tons, plant addition, United Aircraft Corp., Hartford, Conn., to Mahon Structural Steel Co., Detroit.

950 tons, building, Los Angeles *Examiner*, Los Angeles, through Lockwood Green & Co., New York City, to Bethlehem Steel Co.

500 tons, industrial building, North Kansas City, Mo., to Havens Structural Steel Co., Kansas City, Mo.

470 tons, telephone exchange, Yonkers, N. Y., to Grand Iron Works, New York.

350 tons, boiler supports, Lake Calhoun, Ark., through Combustion Engineering Co., to Ingalls Iron Works, Birmingham, Ala.

350 tons, apartment house addition, East 66th St., New York, to Bethlehem Steel Co.

285 tons, public school, district 2, Cheektowaga, N. Y., to R. S. McMannus Steel Construction Co., Buffalo, John W. Cowper Co., Buffalo, general contractor.

200 tons, municipal incinerator, Providence, R. I., to Tower Iron Works, Providence; E. Turgeon Construction Co., Providence, general contractor.

170 tons, New Jersey state bridge, through A. I. Savin Construction Co., Hartford, Conn., to Phoenix-Apollo Steel Co., Phoenixville, Pa.

150 tons, plant alteration, Long Island City, to Schacht Steel Construction Inc., New York.

150 tons, building at Richland, Wash., to Isaacson Iron Works, Seattle.

STRUCTURAL STEEL PENDING

2500 tons, state office building, Des Moines, Iowa; bids May 25.

413 tons, bearing piling, boat steps, Burnham Park, Chicago, for city; Great Lakes Dredge & Dock Co., Chicago, contractor.

365 tons, bearing piling, bridge, sec. 59-F, Grass Lake, Lake county, Ill., for State Highway Division; bids Apr. 30.

280 tons, Benton St. bridge, Iowa City, Iowa; bids Apr. 9.

270 tons, bridge, sec. 59-F, Grass Lake, Lake county, Ill., for State Highway Division; bids Apr. 30.

253 tons, Tri-State Highway, sec. 2425.1 HF, Cook county, Ill., for State Highway Division; bids Apr. 30.

193 tons, bridge, sec. 117-1VF, Montgomery county, Ill., for State Highway Division; bids Apr. 30.

188 tons, Tri-State Highway, sec. 2626.1 HF, Cook county, Ill., for State Highway Division; bids Apr. 30.

185 tons, including steel bars, Washington state bridge, Cowlitz county; bids to Olympia, May 7.

130 tons, bearing piling, Tri-State Highway, sec. 2424.1 HF, Cook county, Ill., for State Highway Division; bids Apr. 30.

Unstated, 40-ton and 25-ton cranes for Hungry Horse dam; bids to Bureau of Reclamation, Denver, May 25.

Unstated, 2214-foot bridge, Williamette river,

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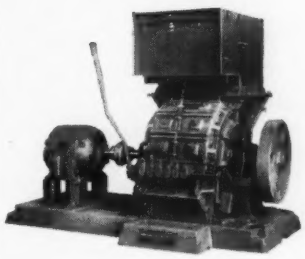

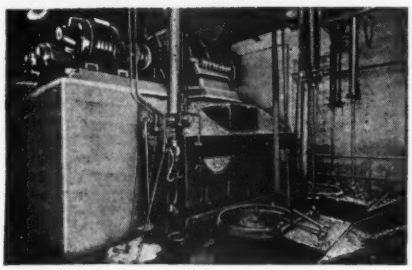

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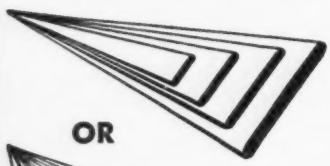
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REINFORCING BARS . . .

REINFORCING BARS PLACED

800 tons, auxiliary outlet sewers, Paulina St. system, cont. No. 1, Department of Public Works, Chicago, to Ceco Steel Products Corp., Cicero, Ill.; M. J. Boyle & Co., Chicago, contractor.

383 tons, sludge disposal building extension, West-Southwest sewage treatment works, Div. "Rb", Sanitary District of Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Kenny-McHugh Co., Chicago, contractor.

200 tons, superstructure, administration and engineering building, Standard Oil Co. of Indiana, Hammond, Ind., to Ceco Steel Products Corp., Cicero, Ill.

200 tons, University of Washington student union building, Seattle, to Northwest Steel Rolling Mills, Seattle; Henrik Vallee, Seattle, general contractor, low $374,123.

100 tons, state training school, Chehalis, Wash., to Northwest Steel Rolling Mills, Seattle.

100 tons, treatment plant, Bellingham, Wash., to Northwest Steel Rolling Mills, Seattle.

REINFORCING BARS PENDING

693½ tons, ⅝ to ⅞-inch round, for McNary dam, Oregon; bids to U. S. Engineer, Portland, May 4.

650 tons, state highway extensions and small bridges; Tolland and Vernon, Conn.; bids May 10, Hartford.

Unstated, material for Crab Creek siphon, Columbia Basin project, Washington state; bids to Bureau of Reclamation, Denver, May 4.

Unstated, two Oregon state bridges, Lincoln and Tillamook counties; Tom Lillebo, Reedsport, Oreg., low $195,537 and $33,028, respectively.

PLATES . . .

PLATES PLACED

375 tons, oil tanks, Texas Co., Westfield, N. J., to Bethlehem Steel Co.

245 tons, oil storage tanks, Point Wells, Wash., for Standard Oil Co.; to Puget Sound Sheet Metal Works, Seattle.

PLATES PENDING

210 tons, stacks and miscellaneous work, Sanitary District of Chicago, Chicago; bids May 6.

137 tons, 36-inch water main, Roseland pumping station, Department of Public Works, Chicago.

PIPE . . .

CAST IRON PIPE PENDING

1900 tons or more, 6 to 12 inch, totaling 114,400 feet; bell and spigot, Class 150; bids in Apr. 29 at Spokane, Wash.

RAILS, CARS . . .

RAILROAD CARS PLACED

Erie, 30 baggage cars, to American Car & Foundry Co., New York.

St. Louis-San Francisco, fifty 70-ton mill-type gondolas, to Pressed Steel Car Co., Pittsburgh.

Terminal Railroad Association of St. Louis, 14 cabooses, to the International Railway & Car Equipment Co.

LOCOMOTIVES PLACED

Norfolk & Western, seven 2-8-8-2 and five 2-6-6-4 type locomotives, to its Roanoke, Va., shops.

RAILS PLACED

1500 tons or more, spikes and bolts, for Alaska Railroad to Bethlehem Pacific Coast Steel Corp., Seattle.

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

BELL GARDENS, CALIF.—Armco Drainage & Metal Products Co., 409 LeRoy St., Los Angeles, will build a $95,000 factory and office at 6155 S. Malt Ave.

LOS ANGELES—Los Angeles Board of Education, 1425 S. San Pedro St., plans to build a $125,000 garage, tool shop and spray paint building.

LOS ANGELES—Junior Steel Co. has been incorporated with 1000 shares of no par value capital stock by Douglas Badt and associates. Firm is represented by Pacht, Warne, Ross & Bernhard, 9700 Wilshire Blvd., Beverly Hills.

LOS ANGELES—Alondra Steel & Wire Co. Inc. has been formed with 5000 shares of no par value capital stock by A. B. Brash and associates. Firm is represented by Greenbaum, Wolfe & Baker, 403 W. Eighth St.

REDWOOD CITY, CALIF.—Hodges Research Laboratory, c/o R. Dalton, engineer, 1723 Webster St., Oakland, has awarded a $75,000 contract to Remmett Construction Co., Box 878, Palo Alto, for erection of a laboratory.

COLORADO

DENVER—Public Service Co. of Colorado, 15th and Champa Sts., has awarded a $14,350,000 contract to Electric Bond & Share Co., 2 Rector St., New York, for design and construction of a 10-story steam power facility to be known as the Arapahoe Plant, at W. Vassar Ave. and S. Navajo St.

CONNECTICUT

BRIDGEPORT, CONN. — Buckley Bros. Inc., 1 Seaview Ave., has awarded a $900,000 contract to Lynn-McLeod Construction Co., 205 Beardsley Ave., Stratford, and Bethlehem Steel Co., Eighth and Lehigh Sts., Lehigh, Pa., for expansions at an oil terminal to include 10 steel storage tanks and other facilities.

DEVON, CONN.—Connecticut Light & Power Co., 36 Pearl St., Hartford, will install two 60,000 kw turbo-generators at a cost of $4 million.

NORWALK, CONN. — Nash Engineering Co., Wilson Rd., has awarded a $75,000 contract to W. J. Lyons, 9 Mechanic St., for a factory.

ILLINOIS

CICERO, ILL.—Thor Corp. has purchased land adjoining its main plant and offices at 2115 S. 54th Ave. to expand production facilities. Company will build a new factory.

EAST ST. LOUIS, ILL.—Socony-Vacuum Oil Co., 26 Broadway, New York, has awarded a $2 million contract to Bechtel Corp., 220 Montgomery St., San Francisco, for modernizing an oil refinery here.

EAST ST. LOUIS, ILL.—Phillips Petroleum Co., Bartlesville, Okla., has awarded a $150,000 contract to Frazier-Davis Construction Co., 1319 Macklind Ave., St. Louis, for a marine terminal on the east bank of the Mississippi.

GRANITE CITY, ILL.—General Steel Castings Corp., Charles P. Whitehead, president, has awarded a $700,000 contract to S. M. Wilson & Co., 1915 Edison Ave., for construction of three buildings.

STICKNEY, ILL.—Cities Service Co., Bartlesville, Okla., will build a $2 million grease and compound plant here.

INDIANA

FT. WAYNE, IND.—Pittsburgh Plate Glass Co., c/o C. H. Packer, 408 Pennsylvania Place, has awarded a $150,000 contract to Max Irmscher & Sons, 113 Ft. Wayne Bank Bldg., for a sales and warehouse building at Douglas and Barr Sts.

FT. WAYNE, IND.—General Electric Co., 1605 Winter St., has awarded a $137,000 contract to Indiana Engineering & Construction Co.,

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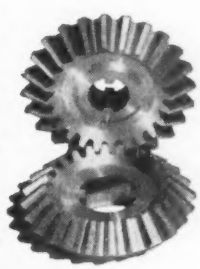

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261 Ft. Wayne Bank Bldg., for erection of a plant addition.

INDIANAPOLIS—Western Electric Co., 195 Broadway, New York, plans to build a $3,500,000 plant on W. 30th St.

RICHMOND, IND. — Crosley Division, Avco Mfg. Co., J. W. Craig, manager, has awarded a $100,000 contract to Ferro Concrete Construction Co., 203 W. Third St., Cincinnati, for erection of a factory addition.

IOWA

SIOUX CITY, IOWA—Producers & Consumers Council plans to build a $100,000 fertilizer plant.

LOUISIANA

WESTWEGO, LA. — Avondale Marine Ways Inc. has been awarded a contract at $1,286,658 by the U. S. Army Engineers for three quarterboats to be used for housing crews of large dredges which will work in isolated locations.

MARYLAND

BALTIMORE—Charles T. Brandt Inc., 1700 Ridgely St., plans immediate erection of a 50,000-sq-ft addition to its Ridgely St. plant for production of large metal stampings.

OHIO

AKRON—Harwick Chemical Co. will construct a $300,000 plant for use as a plastics and research center on a five-acre site at Englewood Ave. and Seiberling St.

CLEVELAND—Nickel Plate Development Co. of Nickel Plate Railroad, Terminal Tower, will build a $127,000 warehouse at 2760 E. Ninth St.

CLEVELAND—Engine Parts Mfg. Co., 1360 W. Ninth St., has awarded a $100,000 contract to Associated Builders Corp., 1426 W. Third St., to rebuild a 4-story structure.

COLUMBIANA, O.—Columbiana Pump Co., Clyde Hoover, president, has awarded a contract to C. C. Kaiser & Son, 100 El Rayen St., Youngstown, for two foundry additions.

COLUMBUS, O. — Curtiss-Wright Corp. has been awarded a $1,500,000 engineering and tooling contract by the United States Air Force to equip itself for production of the jet fighter, the XP-87.

FREMONT, O.—Fremont Rubber Co., Robert P. Johnson, general manager, has awarded a $75,000 contract to Steinle-Wolfe Inc. for a factory addition.

KENT, O.—Lamson & Sessions Co., Cleveland, will expand its cold forge department here with a $150,000 plant addition, scheduled for completion this fall.

LISBON, O.—Hood Chemical Co. recently suffered damages totaling $250,000 from fire at its plant here.

LOGAN, O.—General Electric Co., Schenectady, N. Y., has awarded a $2 million contract to H. K. Ferguson Co., Hanna Bldg., Cleveland, for a factory on a 15-acre-tract one mile north of here.

LORAIN, O.—American Shipbuilding Co. is starting construction soon on a submerged crib which, when finished, will be towed to Cleveland where it will be installed as part of the city's new $6 million water works.

LORAIN, O.—Thew Shovel Co., E. 28th St. and Fulton Rd., expects that plant and equipment investments totaling $750,000 will be made in 1948.

MARION, O.—Monsanto Chemical Co., 1700 S. Second St., St. Louis, has awarded a $5 million contract to Maxon Construction Co., 131 N. Ludlew St., Dayton, for an atomic energy plant on Scioto Ordnance Works site.

MORROW COUNTY, O.—Ohio Fuel Gas Co., 99 N. Front St., Columbus, plans to build approximately 25 miles of new pipeline in this county during 1948 at an estimated cost of $1,500,000.

PERRYSBURG, O.—Peters Stamping Co. has awarded a $100,000 contract to Thal & Schewe Inc., 145 Maumee St., Toledo, for construction of a factory addition.

YOUNGSTOWN—Truscon Steel Co., 1315 Albert St., Peter Robinson, general manager, will erect a $300,000 mill building.

PENNSYLVANIA

NEW CASTLE, PA.—Pennsylvania Engineering Corp. is installing additional large machine shop tools in order to catch up with its backlog, largest in peacetime history. Backlog orders include a 30-ton bessemer converter for Jones & Laughlin Steel Corp. and a 800-ton hot metal mixer for Wheeling Steel Corp.

PHILADELPHIA — Peerless Steel Equipment Co., Unruh St. and Hasbrook Ave., has awarded separate contracts totaling $70,000 for construction of an office and manufacturing plant addition.

TITUSVILLE, PA. — Universal Cyclops Steel Corp. expects to start a $300,000 expansion program to include an annealing building, two rolling mill buildings and an ingot storage facility.

WISCONSIN

EAU CLAIRE, WIS. — National Pressure Cooker Co., 1515 Ball St., has awarded a contract to Evans-Lee Co., 600 Cameron St., for a factory.

MANITOWOC, WIS.—Manitowoc Public Utilities, 817 Franklin St., has awarded a $155,000 contract to Hamann Construction Co., for power plant additions and improvements.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Continued from Page 157*)

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l. bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. (**Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c, c.l. packed 6.05c, ton lot 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17,50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.40c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone contract, 100 lb or more. 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western add 2.9c, freight allowed. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 10c, ton lots 10.25c, smaller lots 10.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: (17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.